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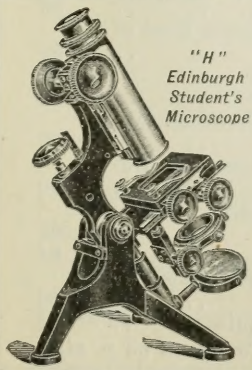

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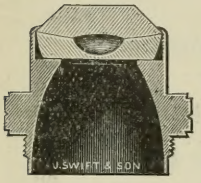

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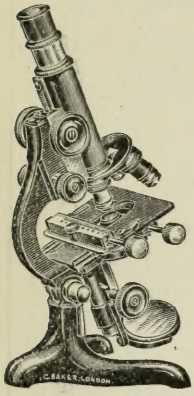

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TROPICAL DISEASES BULLETIN.

Vol. 17.] 1921. [No. 1.

AMOEBIASIS AND DYSENTERY.

Amoebiasis.

MacAdam (William). **The Amoebic Dysentery Carrier. The Effects of the Infection on the Individual and the Community with some Observations on its Treatment.**—*Indian Jl. Med. Res.* (Spec. Indian Science Congress Number 1919). pp. 135–141.

The outcome of military operations in the East has been to render possible the study of large numbers of cases of amoebic dysentery amongst Europeans. Observations were directed to :—

(1) The epidemiological effects resulting from carriers of this infection in a tropical community.

(2) The effects of the presence of this persistent infection upon the individual himself.

An examination of 946 men was made at the depot of Deolali ; of these 595 were convalescents and 351 patients in the non-dysentery wards there. Of the latter 13·6 per cent. were *histolytica* carriers and 17·8 per cent. of the former.

Applying Dobell's figures for correction (that is to say from a solitary examination the chances are *against* the examiner, 2 : 1) it becomes clear that at least one-third of the men in the hospital wards in India are harbouring cysts of *E. histolytica*. 216 men of a draft which had been but nine months in India yielded 9 per cent. of carriers.

The question arises in view of these results : Is the detection and treatment of *histolytica* cases and the attempted clearing of patients convalescent from amoebic dysentery of much practical value in the prevention of the spread of the disease ? It is a moot question whether isolation of a few gross carriers is of much avail from the point of view of prophylaxis. An analysis of 77 cases shows that an average period of at least 8½ months must elapse from the onset of dysenteric symptoms up to the date of the finding of pathogenic cysts in the faeces.

As regards the efficacy, or otherwise, of various methods of treatment the need of a careful classification of the cases before assessing the value of any particular line of treatment is paramount. It is absurd to group all cyst carriers together for the purpose of calculating the percentage of relapses obtained after the completion of treatment.

Of the 80 cases under review 36 were chronic dysenterics of over 6 months standing ; the shortest was 5 weeks, the longest 32 months

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All gave a history of two or more attacks, the average number per case being three.

Of the 36 cases, 11 or 30 per cent. showed signs of persistent infection within 6 weeks of the completion of the treatment, while 8 of these persistent carriers reported an acute relapse within 6 months following the 18 grain course of combined emetine treatment.

32 cyst carriers giving no history of previous dysentery, or of only a mild attack, were similarly treated with the result that in only 4 or 12 per cent. did the infection persist.

Out of the total of 80 cases, 62 men were reported as cured after 26 protozoological examinations had been carried out subsequent to treatment.

P. H. Manson-Bahr.

Boulenger (C. L.). **Records of the Occurrence of Intestinal Protozoa in British and Indian Troops in Mesopotamia.**—*Indian Jl. Med. Res.* 1919. July. Vol. 7. No. 1. pp. 1–7.

The author's statistics, summarised below, show a much higher percentage of *histolytica* infection in Indian than in British cases.

	British cases.			*Indian cases.*		
	Dysentery, Diarrhœa, Colitis, &c. including convalescents. 1378.	Acute dysenterics. 442.	Non-intestinal cases. 200.	Dysentery, Diarrhœa, Colitis, &c. 906.	Acute dysenterics. 135.	Non-intestinal cases. 200.
	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
E. histolytica	14·5	24·8	6·5	20·7	48·1	10·5
E. coli ..	19·1	—	21	30·4	—	40·5
Lamblia intestinalis.	9·7	—	8·5	8·1	—	8
Trichomonas intestinalis.	8	—	2·5	10·6	—	4
Chilomastix mesnili.	5	—	4	3·3	—	3
Isospora ..	0·6	—		0·1	—	—
E. nana ..	no record.	—	6	9·9	—	9

A. Alcock.

Kofoid (Charles Atwood) & Swezy (Olive). **On the Prevalence of Carriers of Endamoeba dysenteriae among Soldiers Returned from Overseas Service.**—*New Orleans Med. & Surg. Jl.* 1920. July. Vol. 73. No. 1. pp. 4–11.

In contrast with bacillary infections producing dysentery, the protozoan infections are more persistent and pass more readily into the carrier phase. The increased incidence of amoebic infection as the war progressed has been noted by English, French and American

observers. The carefully worked out statistics based upon an examination of 2,300 overseas men and 576 home service men warrant the following conclusions :—

(1). The number of carriers of amoebiasis in the United States has been greatly increased by the infections in soldiers returning from overseas.
(2). A larger number of carriers than has hitherto been suspected exists in the normal population of the United States.
(3). The dysenteric syndrome is not an essential feature of the disease and the infection is by no means limited to the tropics.
(4). The carrier phases are persistent and afford possible foci of contagion.
(5). The percentage of carriers relapsing or developing serious sequelae is as yet unknown.

Increased attention is called for on the part of the practitioner in all obscure intestinal cases to the possibility that *Endamoeba dysenteriae* (sic) is the etiological factor or accessory to the disease.

P. H. M–B.

KUENEN (W. A.). **Amoebiasis in Nederland.**—*Nederl. Tijdschr. v. Geneesk.* 1918. Sept. 28. Vol. 62. 2nd Half. No. 13. p. 1140.

This important paper—already briefly noted in this *Bulletin* (Vol. 14, p. 311)—was read in May, 1918, at a meeting of the Dutch Medical Association in Amsterdam.

The author, already well known for his work on amoebiasis in the Dutch Indies, presents the results of investigations which he undertook to ascertain whether *Entamoeba histolytica* occurs in Holland. He observes that Holland has been receiving for years—indeed for centuries—a continual stream of amoebic carriers from her colonies ; and he states that many such carriers are to be found at home at the present day—especially among the military class. Apart from these, however, he desired to find out whether any indigenous infections with *E. histolytica* occur in Holland ; and accordingly he began to examine, in Professor PEL's clinic, the stools of persons who had never been abroad. He finally succeeded in finding several such cases, of which the following is a short summary :—

Case 1. A dock worker. *E. histolytica* cysts frequently present in stools. No symptoms referable to the infection could be detected during his stay in hospital. This patient had worked aboard Dutch ships plying between Holland and the East Indies, and had therefore probably been in contact with amoebic carriers.

Case 2. A soldier—but by calling a miner. Investigated by Dr. BIJLSMA. Cysts of *E. histolytica* in stools, but no intestinal symptoms. No contact with members of family or friends who had been in the Indies could be established.

Case 3. A boy of 12 from Amsterdam. For 8 months previously had suffered from intermittent attacks of dysentery. Loose stools, containing blood and mucus, in which typical *E. histolytica* amoebae were found.

Case 4. Another Amsterdam boy of 12. Diarrhœa intermittently for 5 months, with abdominal pain. Stools full of precystic and encysted forms of *E. histolytica*. Later bloody mucus appeared in the stools, and in it typical tissue-forms of the parasite were found.

Case 5. A married Amsterdam woman, aged 32. Since 18 years old she had suffered from attacks of diarrhœa, sometimes accompanied by the

passage of blood and mucus. Stools half-formed, full of precystic forms and cysts of *E. histolytica*.

Case 6. A daughter of the preceding. Had suffered occasionally from bowel trouble, and a year previously passed some blood and mucus in her stools. Typical cysts of *E. histolytica* found in faeces.

Case 7. Another daughter of Case 5. No symptoms of intestinal disorder. A few *E. histolytica* cysts present in faeces.

Case 8. A married woman, native of Wormerveer, living at Haarlem. Aged 32. For last 14 years had suffered intermittently from attacks of severe diarrhœa. Large numbers of *E. histolytica* cysts present in stools

The following interesting details are also recorded about these cases. The two boys (Cases 3 and 4) were unacquainted with one another, and had spent hardly a single day out of Amsterdam in the whole of their lives. The father of No. 3 had been for 3 weeks in the Indies, some 20 years previously; but apart from this, there was no evidence that either patient had been in contact with relatives who had been in the Indies. All the members of both families were examined, but none found to be carriers of *E. histolytica*. Both boys were treated with hypodermic injections of emetine hydrochloride; but though their symptoms cleared up, both remained carriers after treatment.

As regards Case 5, no contact with relatives who had been in the Indies could be demonstrated. Examination of the other members of her family showed that, while the two daughters (Cases 6 and 7) were also infected, her husband was not. The husband and son of Case 8 were also examined, but neither was found to be infected with *E. histolytica*.

These cases are discussed by the author at some length: and his conclusion that all the patients were really infected with *E. histolytica*—and not with some amoeba differing from the tropical parasite—appears fully justified. In this connexion the large proportion of the cases (5 out of 8) displaying symptoms of diarrhoea or dysentery is noteworthy. The symptoms were, moreover, closely similar to those commonly seen in tropical cases of amoebiasis.

The author next attempts to solve the problem how these patients acquired their infections. He reaches no definite conclusions, but mentions the following points which may have some bearing on the question.

It is possible that Case 1—the docker—acquired his infection on board ship: and it is possible that some of the other cases were infected through contact with carriers who had imported infections from abroad. It appears unnecessary, however, to seek a foreign origin for all the Dutch cases, since there is evidence that *E. histolytica* can spread in the population of Holland without foreign intervention. Case 5 appears to have infected her two children (Cases 6 and 7); and Kuenen states further that a Javanese laboratory attendant of his in Medan (Sumatra) was not only a carrier himself but infected all his children soon after birth. Moreover, *Entamoeba coli* occurs commonly in the resident Dutch population: and as this species is disseminated in the same way as *E. histolytica*, there seems to be no reason why the latter should not have become, and now remain, equally endemic in Holland. Since the cysts of *E. histolytica* can be conveyed by water, the author makes note of the fact that the two boys (Cases 3 and 4), who both began to suffer from dysentery in the summer of the same year, had both frequented the same public bathing place during that summer—a bathing place connected with the canals. Kuenen characterizes these canals at Amsterdam as being nothing better than "open sewers."

There appears to be no reason to suppose that there is anything in the climate or conditions in Holland to invalidate the conclusion that *E. histolytica* occurs indigenously in that country. Kuenen's observations make this appear highly probable ; and he rightly emphasizes, in conclusion, the importance of recognizing amoebiasis—whether native or imported— as a condition not peculiar to the tropics, but one with which the home physician will in future have to reckon.

In the discussion which followed the reading of this paper, NOLEN recalled the fact that in 1908 he had a patient who had suffered from dysentery for two years. He was a Dutch fisherman, aged 42, from Vlaardingen ; and in following his calling he had never been ashore in any foreign country save England. He had never been in the tropics or even in Eastern Europe. In the bloody mucous stools of this patient large numbers of active amoebae containing red blood-corpuscles were present.

[From the foregoing observations there can be little doubt that *E. histolytica* occurs indigenously in Holland. This conclusion is supported analogically by the more extensive records of the indigenous occurrence of this organism in the British Isles and in France. The work of MATTHEWS and Malins SMITH especially (this *Bulletin*, Vol. 14. p. 90)—with which Kuenen was evidently unacquainted, though their results were already partly published when he wrote—has proved that *E. histolytica* is by no means uncommon in Britain. Taken in conjunction with the observations made in France, and those more recently recorded in Germany, this work makes it clear that *E. histolytica* is as much at home in these parts of western Europe as it is in its better known " endemic centres " in the tropics.]

Clifford Dobell.

GOEBEL (Oswald). **Contribution à l'étude de la Dysenterie Amibienne Chronique.**—24 pp. 1920. Schaerbeek. Imprimerie J. Vander Hoovon, 296, Chaussée de Haecht.

This paper contains no useful addition to the knowledge of the treatment of chronic amoebic dysentery ; emetine hydrochloride injections by themselves are not a complete cure for chronic amoebiasis. The author believes that intravenous injections of novoarsenobillon are of great use both in acting as a tonic and in promoting the growth of granulation tissue and consequent healing of the intestinal ulcerations.

P. H. M-B.

HAGE. **Ueber die Diagnose der Amöbenruhr.** [Diagnosis of Amoebic Dysentery.]—*Deut. Med. Woch.* 1920. June 17. Vol. 46. No. 25. pp. 682–684.

This paper draws attention to the importance of a knowledge of amoebic dysentery to all European doctors, commensurate with the widespread distribution of this disease both during and subsequent to the war.

Positive results from microscopic examination can be expected only when fresh material is examined and when the laboratory is situated in close proximity to the source of supply. Through neglect

of these simple precautions various "misdiagnoses" are cited as having occurred in Germany.

The remainder of the paper consists of a summary of recent work upon the the diagnosis and treatment and pays special attention to rapid methods for staining amoebae and their cysts in faeces. The author has been unable to substantiate the presence of any specific amoebic antigen either in liver abscess pus or in amoebic dysentery stools; the probability being that such a substance does exist, but in a quantity so minute as to render its extraction a matter of great difficulty.

P. H. M-B.

Lynch (Kenneth M.). **Penetration of the Intestine by Endameba histolytica.**—*Jl. Amer. Med. Assoc.* 1920. July 3. Vol. 75. No. 1. pp. 5–6. With 4 figs.

The particular point upon which these observations bear is the means by which the amoeba gains entrance to the tissues of the wall of the intestine. The author believes, and illustrates this point by means of microphotographs of intestinal sections, that the amoebae do not pass through the surface of the mucosa, even though there may be large denuded areas where the epithelial covering has been lost, but that they invade the glands of Lieberkühn.

In the earlier stages of penetration the amoebae form a nest at the base of the crypt surrounded by detritus of decomposed epithelium; the next development appears to be a migration from this nest through the basement of the gland into and through the intervening tissues into the submucosa. The port of entry having been established there occurs a fairly wide migration for a considerable radius in all directions, save towards the lumen of the intestine. Then a thrombosis of the blood vessels of the submucosa or muscularis supervenes, with consequent necrosis of the tissues above and the development of an ulcer leading to the surface.

The accumulation of amoebae in the submucosal tissues is attended by a low grade inflammatory reaction with oedema, lymphocytic infiltration and fixed tissue proliferation.

In the main ulcers do not go beyond the submucosa, though occasionally the process may extend through the wall and form a ramifying abdominal abscess. In the necrotic tissues no amoebae can be demonstrated on section; they are encountered in the loose tissues beyond the active inflammation. Always they are the vanguard, the destruction taking place behind them.

P. H. M-B.

Hogan (E. P.). **Appendicitis caused by *Entameba histolytica* with Postoperative Amebic Ulcer Perforation of Cecum.**—*Jl. Amer. Med. Assoc.* 1920. Sept. 11. Vol. 75. No. 11. pp. 727–732. With 9 text-figs.

This paper consists of a report in extenso of a case of amoebic ulceration of the caecum and appendix; perforation of the latter was the cause of death. The paper is well illustrated by microphotographs and drawings of the tissues showing the "amebas" *in situ*.

The patient, a negro, aged 33, gave an unimportant history with no reference to previous diarrhoeic or dysenteric attacks. He presented all

the signs and symptoms of acute appendicitis and was operated upon and the appendix removed. He died subsequently from intestinal haemorrhage.

At autopsy two abscesses of the liver, one superficial to, the other deep in the right lobe, were found, and in the pus amoebae were demonstrated. Numerous amoebic ulcers were present in the caecum together with considerable hypertrophy of the intestinal walls. In the appendix a rugged area of ulceration involved one quarter of the inner circumference of the walls and extended downwards irregularly to the submucosa. Large numbers of amoebae were demonstrated in section of the two abscess walls.

The familiar histological appearances of the tissues invaded by amoebae are well illustrated, the organisms being demonstrated within the blood and lymphatic vessels in the intestinal wall. In a series of 50 deaths from intestinal amoebiasis without diarrhoea Musgrave (1910) has previously reported 3 cases of peritonitis following perforation of the appendix.

P. H. M-B.

Vaccarezza (R. F.) & Finochietto (R.). **Amibosis intestinal sobreaguda. Caso mortal por necrosis del ciego y porción final del ileón, con peritonitis consecutiva.** [Hyperacute Intestinal Amoebiasis. Case with Fatal Termination due to Necrosis of Caecum and Terminal Portion of Ileum with Resultant Peritonitis.]—*Prensa Medica Argentina.* 1919. Sept. 30. With 10 figs.

The patient was admitted to the Hospital Rawson (Buenos Aires) on the 20th day of the disease for surgical treatment, as he had, from the 13th day, begun to complain of pain in the right iliac fossa and marked signs were present of acute inflammation in that region. At the operation, the day after admission, an abscess was found containing non-foetid cheesy pus with blood and faecal matter. Examination of the pus shewed it to be swarming with motile amoebae. The patient sank and died the day after the operation. At the autopsy the caecum and terminal portion of the ileum were found completely necrosed and with numerous perforations. Ulcers were numerous along the whole course of the colon, sigmoid and rectum, many on the point of perforation. In the ileum, 2 centimetres above the ileo-caecal valve, was a large perforation and a smaller one a few centimetres higher again. Amoebae were numerous in all the damaged tissues, including those of the ileum.

F. S. Arnold.

Bauche (J.). & Motais (F.). **Sur un nouveau cas de dysenterie amibienne du chien.**—*Bull. Soc. Path. Exot.* 1920. Mar. 10. Vol. 13. No. 3. pp. 161–165.

Spontaneous amoebiasis of the dog was first noted by Kartulis, and more recently by Ware in India [this *Bulletin*, Vol. 8. p. 444]. The present case recorded by the authors had but recently arrived in Cochin China. The mucopurulent stools contained numerous entamoebae, as well as ova of Spiroptera. The animal died apparently from emetine poisoning.

In the discussion Gauducheau relates his experience in the experimental production of amoebiasis in dogs and in the transference of the

infection from one animal to another by means of the inoculation of mucus into the intestinal canal.

Very inconstant results are obtained in different animals even when large quantities of blood and mucus are injected intrarectally into monkeys, cats etc.; this is attributed to variations in the bacterial fauna.

P. H. M-B.

YUKI (Gentsu). **Klinische Studien ueber Amöben-dysenterie.** [Clinical Study of Amoebic Dysentery.] [In Japanese.]—*Kyoto Igaku Zassi.* 1920. Feb. Vol. 17. No. 2. [Author's summary in German p. 5.]

As a result of minute study of the literature of the subject and prolonged clinical observations upon the symptomatology and treatment of amoebic dysentery the author is convinced that the eradication of amoebae from the lesions is best effected by the combination of emetine injections with rectal enemata of quinine tannate.

P. H. M-B.

THOMPSON (T. O.). **Amoebic Dysentery. The Use of Silver Nitrate Irrigations for the Diagnosis of Doubtful Cases of Chronic Diarrhoea.** —*Jl. Roy. Army Med. Corps.* 1920. May. Vol. 34. No. 5. pp. 435–437.

Encouraging results were obtained with silver nitrate rectal irrigations (silver nitrate 1 drachm in one ounce of water, made up to 2 pints with warm water) in intractable cases of amoebic dysentery. Two dozen cases were treated in this manner, and it was noted that *E. histolytica* cysts appeared in the motions on the third or fourth day after the initiation of this treatment when they had previously been absent. The method appears to be applicable to those cases in which there is little or no diarrhoea, no present or past history of haemorrhage, and little except abdominal discomfort and pain.

P. H. M-B.

MAYER (T. J. G.). **A New Vehicle for Emetine Bismuthous Iodide.**—*Jl. Trop. Med. & Hyg.* 1920. May 1. Vol. 23. No. 9. p. 110.

The problem of finding a suitable vehicle for E.B.I. locally, which could pass through the stomach unchanged and be subsequently digested, was obtained by rubbing up the drug with 16 parts of mutton fat, moulding the mass into pills each 7 gr. in weight and covering with a layer of melted fat. Pills containing $1\frac{1}{2}$ gr. of the drug and $7\frac{1}{2}$ gr. of mutton fat are about as large as can be swallowed.

P. H. M-B.

LUDLOW (A. I.). **Abscess of the Liver. (Supplementary Report).**—*China Med. Jl.* 1920. May. Vol. 34. No. 3. pp. 258–261.

Two series of liver abscess cases have been collected by Dr. Ludlow, comprising altogether 60 cases (Koreans). In the first series of 30 cases there were 4 deaths—mortality 13·3 per cent.; in the second series there were 3 deaths—10 per cent. mortality. The preponderance of

the male sex is well shown : there were 56 males and 4 females. The abscesses were situated in right lobe only in 57 instances, in the left lobe only in 1 ; in both lobes in 2.

Operation for the most part consisted in drainage through the opening formed after excising a portion of the ninth rib. Dakin's solution and hypertonic saline do not seem to hasten the healing process in any way ; the latter is preferable. On account of the large size of the abscesses the author has so far hesitated to inject emetine (gm. 0·15) into the abscess cavity, but hypodermic injections of emetine (gr. 1) are given daily for 4 days before the operation.

As a result of this extensive experience the following advice is given :—

"(1). Keep a mental attitude of suspicion as to the possibility of abscess of the liver in localities where amoebic dysentery is prevalent, and do not exclude the diagnosis because of normal pulse, temperature, respirations, or blood count.

"(2). Use the aspirator only when preparations are made for further operation, unless the aspirator used is very small. Nothing but positive findings are of value.

"(3). While it may be necessary to vary the operation according to the condition found, yet in most cases the operation described in my former article proves satisfactory [*China Med. Jl.*, 1917. May. Vol. 31. No. 3. pp. 207–212 . v. this *Bulletin*. Vol. 10. p. 138].

"(4). It is very important to keep a good opening for drainage. If the subsequent cure of the case is left to an assistant, unless he is well instructed he is very apt to let the external opening close too quickly."

P. H. M-B.

DUCKWORTH (Dyce). **The Diagnosis and Treatment of Tropical Hepatic Abscess.**—*Jl. Trop. Med. & Hyg.* 1920. June 15. Vol. 23. No. 12. pp. 149–150.

Three forms of hepatic abscess are recognised :—

(a) Suppurative pylephlebitis ;

(b) Pyaemic abscess—generally multiple.

(c) Tropical or amoebic abscess—usually single.

(a) *Suppurative pylephlebitis* generally arises from diseases of the colon or appendix, possibly from suppuration of the mesenteric glands, or abscess of the gall-bladder. Jaundice may be associated with this, generally a fatal condition.

(b) *Pyaemic abscesses*, generally small and multiple, are closely related to the former. They may arise from middle-ear disease, acute periostitis, bacillary dysentery, appendicitis, or gall stones in the bile-ducts. There is high fever and jaundice, with an enlarged and painful liver.

(c) The leading characteristics of *tropical abscess* of the liver are : — Solitary or few in number ; course often latent and insidious ; usually a history of dysentery ; infrequent in women, unknown in children ; rare before 20, commoner after 25 years of age ; jaundice slight ; spleen not enlarged ; commoner in the East than in the West Indies.

The remainder of the paper contains a resumé of the generally accepted teaching upon the clinical signs, symptoms, course and treatment of hepatic abscess.

As a matter of historical interest we note that emetine was employed in the treatment of acute dysentery by ECCLES, Senior Surgeon to

the Great Indian Peninsular Railway Company as far back as 1869. He prescribed ½ gr. with ⅓ gr. of morphia and 2 gr. of sugar in powders every four or six hours. This is the first occasion upon which this most interesting statement has been made public.

P. H. M-B.

Neeb (M. H.). [In Dutch and English.] **De beteekenis van het leucocytenbeeld voor de differentieele diagnostiek lever-hyperaemie en tropisch lever-absces. The Value of the Leucocyte Formula for the Differential Diagnosis between Hyperaemia of the Liver and Tropical Abscess of the Liver.**—*Meded. Burgerlijk. Geneesk. Dienst in Nederl.-Indië.* 1920. Part 2. pp. 66–105. With 1 chart.

The differential diagnosis between hyperaemia of the liver of amoebic origin and actual hepatic abscess may be simplified very considerably by more intimate observation upon and interpretation of the three components of the leucocytic count, particularly of the Arneth shifting and its index in the neutrophile cells. The solution of this problem may be attained with great certainty and the patient is saved the pain of liver puncture by the use of emetine injections in the pre-suppurative stage. The leucocyte examination of the blood should be considered in close relationship to the clinical observations.

In support of his contentions the following table is given :—

	Amoebic hepatitis.	Amoebic abscess.
Number of leucocytes.	Often (iso-) hyperleucocytosis.	Increasing (aniso-) hyperleucocytosis from 14,000 to 45,000.
Eosinophile cells.	Increased, normal or slightly subnormal.	Rapidly decreasing, even to aneosinophilia.
Lymphocytes.	Lymphocytosis or normal number.	Lymphocytopenia.
Big mononuclear and transitional cells.	Normal or increased.	Generally decreased.
Neutrophile cells.	Usually decreased, even to a considerable neutropenia.	Increasing neutrophilia, even to 95 per cent., usually between 80 and 90 per cent.
Regenerative Arneth's shifting to the left.	Absent or present to a very small extent (physiological in the tropics).	Increasing, sometimes very considerable shifting-index to the left.
When observed continually.	The above mentioned symptoms usually are remaining stationary.	The above mentioned changes are taking a progressive character at a different pace.
Influence of a proper emetine-treatment.	The subjective and objective symptoms, particularly those of the liver itself usually are lessening quickly.	Partly lessening of the symptoms, development of an "abcès mort," in which case later on, if the volume of the pus is not very small, surgical removal of the pus is necessary.

These conclusions were arrived at after minute study of 24 cases, of which most excellent protocols are given.

The author realizes, however, that occasionally a case of hepatic abscess, without a definite leucocytosis, may be encountered. The excellent effect of the emetine-treatment can be gauged by :—

Decrease in the total number of leucocytes from 22,300 to 13,000 within 1½ months.

Increase in the number of lymphocytes from 45 to 55 per cent.

Decrease in the number of neutrophile cells from 47 to 37 per cent.

Retrogression of the Arneth's shifting-index from the left.

P. H. M-B.

PANAYOTATOU (Aug.). **Trente-quatre cas d'hépatite amibienne aiguë. Valeur diagnostique et pronostique de l'examen leucocytaire du sang. Action abortive et curative de l'émétine.**—*Bull. et Mém. Soc. Méd. Hôpit. de Paris.* 1920. Oct. 14. Vol. 36. No. 29. pp. 1217–1224.

Six cases of hepatic abscess "cured without operation," as well as twenty-eight cases operated upon, are quoted. Great stress is rightly laid upon the value of microscopic blood-examination and especially the leucocyte count in such cases. This count varied, according to the protocols given, from 18–35,000 per c.mm. In three instances a prolonged course of injections of emetine proved efficacious ; in an equal number the diagnosis of hepatitis without pus formation was made and treatment on similar lines led to equally favourable results.

In view of the small number of cases of amoebic abscess previously reported (about 12 in all) in which the diagnosis was rendered absolute by exploratory puncture and which were subsequently cured without emetine, the three other similar instances quoted in this paper are particularly valuable. On the other hand the 28 surgical cases had been treated medically with emetine injections for a week without any perceptible improvement. The leucocyte count in these cases gave no assistance, for the leucocytosis differed in no way from those which were cured without surgical interference. Naturally emetine has no effect upon abscesses, either of large dimensions or when small multiple foci are present.

P. H. M-B.

BROWN (Robert E.). **Rupture of Abscess of Liver : Report of Case.**—*China Med. Jl.* 1920. July. Vol. 34. No. 4. pp. 387–388.

In this case—a Chinaman with severe amoebic dysentery—the rupture of hepatic abscess took place while the patient was in hospital. Tenderness and oedema were noted in the right axilla : the right pupil became dilated and the patient's voice was lost, evidently due to pressure paralysis.

At autopsy perforation of the diaphragm, one inch inwards from the point of insertion on the rib and in the anterior axillary line, was discovered opening into a large abscess cavity in the right lobe of the liver ; a second smaller abscess was also present.

P. H. M-B.

Proust (Robert) & Ramond (Louis). **Pyothorax considérable par rupture d'un abcès amibien du foie dans la plèvre guéri, sans opération, par de simples ponctions, l'émétine et le novarsénobenzol.**—*Bull. Mém. Soc. Med. Hôpit. de Paris.* 1920. July 29. Vol. 36. No. 27. pp. 1086–1094. With 2 text-figs.

This paper is a detailed account of a large hepatic abscess which ruptured into the pleura. Aspiration of two litres of pus through the chest wall and rigorous emetine therapy together with the ingestion of 914 (Novarsenobillon) in keratin capsules *per os*, to the extent of 2·3 gms., effected a permanent cure of what undoubtedly was a very critical case. The authors consider the latter combination an ideal one, which should be given a much more extensive surgical trial.

P. H. M-B.

Daumas (A.) & Cotte (J.). **Pseudo-Parasites dans un abcès du foie.** – *C.R. Soc. Biol.* 1920. May 29. Vol. 83. No. 18. pp. 795–797.

Curious mucoid degeneration bodies were observed in sterile pus abstracted from a liver abscess. They bore a strong resemblance to structures known as *Monas pyophila* found by Grimm under similar circumstances in Japan.

P. H. M-B.

Kaku (T.). [**Studies in Development of the Intestinal Amoebae of Man.**]—*Taiwan Igakkai Zasshi* (*Jl. of the Formosa Med. Soc.*). 1919. May 28. No. 199. pp. 605–625.

1. *Entamoeba coli*.—The author could not confirm the process of autogamy as seen by Schaudinn and many others but does not agree with Hartmann in interpreting the formation of eight nuclei by simple binary fission taking place three times. The frequent occurrence of 5 or 6 uniform-sized nuclei cannot be interpreted by Hartmann's hypothesis. There are two methods of the formation of minute amoeboid bodies from the cyst. In the first place the germs after emergence from the cyst grow larger, up to 8–10 times the original size, and then either through successive binary fissions or multiple fission there are formed minute amoeboid bodies, 1·5 to 2 micra in diameter. The other method is less frequently met with than the first : the germs here, either having undergone repeated binary fission or a multiple fission inside the cyst, give rise to the minute amoeboid bodies.

2. *Entamoeba histolytica* and *E. tetragena*.—The author believes he has seen some figures of multiple fission in the form he has identified as *E. histolytica*. The globular buds containing the chromidia which detach to form the germs, as seen by Schaudinn, were met with only in *E. histolytica*. Further, the author found in this species the stage where eight daughter nuclei had been formed as seen in *E. coli*, the occurrence of which Schaudinn denied in *E. histolytica*. This was found in the faeces left for a day or two under ordinary indoor temperature. The cyst measures 16–20 micra in diameter, containing 2–4, 6, 8 or 10 nuclei, being larger in size than that of *E. coli*, and vacuoles are few. Moreover, chromidia are large, and in the two-nucleated

stage there are found 2 or 3 karyosomes in each nucleus. In both "species" of dysenteric amoebae an extremely thin investment could be seen, which simply becomes hard and visible when encystment sets in. The further development of the cyst in these two species is found to be similar to that of *E. coli*, showing the two ways as stated above, but the amoeboid bodies formed are much smaller, measuring even 0·5–0·7 micra in diameter.

Hiroshi Ohshima.

Engman (M. F.) & Heithaus (A. S.). **Studies, Reports and Observations from the Dermatological Departments of the Barnard Free Skin and Cancer Hospital and the School of Medicine, Washington University. (1) Amebiasis Cutis.**—*Jl. Cutan. Dis. including Syph.* 1919. Nov. Vol. 37. No. 11. pp. 715–739.

This is a record of an extraordinarily deep and extensive ulceration of the skin, almost gummatous in appearance, associated with an undoubted amoebic ulceration of the large intestine. In confirmation of their studies in the first case in which an autopsy was obtained and a detailed pathological examination made, the authors have cited two other cases of skin ulceration unassociated with any bowel disorder which they believe to be of the same nature.

The first patient was a boy of five years of age who presented deep serpiginous ulcers, one on the left side of the body the size of a large saucer. Others of smaller dimensions were situated on the neck and leg. The trouble commenced as a series of blisters. The temperature on admission was 103°F. and blood examination revealed "estivo-autumnal and quotidian types of malarial plasmodia"; examination of the stools disclosed an amoeba. After the exhibition of small doses of emetine the general condition of patient, as well as of the skin in particular, greatly improved, but subsequent injections both subcutaneously and intravenously had no such beneficial effect. The child appeared to succumb to a generalized sepsis.

The conclusion arrived at by the authors was that they were dealing with an "amoebic infection of the skin," probably produced by auto-infection from the alimentary canal, but not being "amebiologists" they do not seem quite sure of their ground.

The organism obtained from scrapings of the ulcerated area showed sluggish amoeboid movement, the cytoplasm consisting of a granular endoplasm and a clearer ectoplasm. Amoeboid movement was observed on a warm stage. [The sketches illustrating this point cannot be said to be very convincing.] Ingested red blood corpuscles and some bacteria were observed and as many as two vacuoles. The motile forms from the cutaneous pus and those in the faeces appeared to be identical. Animal experiments upon rabbits, rats, guinea-pigs and kittens proved negative. Histological studies on sections of the ulcer revealed rarely encysted "amebas" in the cutis, more usually vegetative forms, three to six times the size of the red blood cells. Similar organisms were found in sections of the submucosa of the large intestine.

The second case reported had been diagnosed some time previously (1910) on purely clinical grounds. The third came from the same district in Missouri as the boy; an ulceration extended over the

entire posterior surface of the right hand and examination of the pus revealed exactly similar bodies to those already cited, " most of them being in the cystic stage."

The condition in this instance also yielded quickly to emetine. [It is doubtful whether the structures identified as amoebae in the microphotographic reproductions of skin sections represent these organisms. There is a complete absence of nuclear detail, which would have been apparent had the tissues been stained by an iron-haematoxylin method. Nor can it be said that the outline drawings of the amoebae found in the pus give one a true idea of the appearance of these organisms in an unstained state. Although the authors cite these as the first recorded instances of amoebic infection of the skin, yet others have been recorded in this *Bulletin*, Vol. 1. pp. 182, 455, 710 ; Vol. 12. p. 10.]

P. H. M-B.

VON SCHUCKMANN (W.). **Untersuchungen über das serologische Verhalten verschiedener Amöbenstämme.** [Research on the Serological Reaction of Various Amoeba Strains.]—*Arb. a. d. Reichsgsndhtsamt.* 1920. Vol. 52. No. 1. pp. 133–162. With 1 fig. in text.

Already in 1912 COCA was able to produce immunity reactions and positive complement-deviation tests in rabbits artificially injected with amoebae, such as *Amoeba proteus* grown artificially on agar plates. In the course of the present investigation Schuchmann has employed six amoeba strains isolated from hay, straw and moss, etc. By composition of an agar particularly weak in nutrient substances (20 parts of agar, 100 parts of bouillon and 900 parts of distilled water) he was able to limit the excessive growth of bacteria. By striking out the culture in a a radial manner from the centre of the plate as in spokes of a wheel he was able, from the periphery of the radiations, to obtain a concentrated emulsion of amoebae. After a number of experiments it was discovered that the amoebae could be fed upon bacteria killed by chloroform vapour ; an agar plate heavily overgrown with the organisms was utilised and a concentrated emulsion of amoebae in sterile distilled water was subsequently spread over it. Two of the amoebae strains developed, on further subculture, biflagellated forms.

In order to produce immune sera amoebae were washed off with 2 cc. of 0·85 per cent. saline and injected intravenously into rabbits at 8 day intervals, 0·25 cc. being used as the initial dose.

It is impossible to separate the amoebae from their associated bacteria by long continued centrifugation, though by the method already described the author claims to have succeeded in obtaining an almost pure emulsion. The amoebic concentrate was not found to possess any lytic properties, but, as a rule, in the presence of a highly immunized serum, most of the individuals assumed the cystic form. Attempts to produce a complement-deviation reaction were successful, in so far that positive reactions were obtained, both with the amoebic concentrate as well as with emulsions of the saprophytic organisms forming their food supply.

The test was put up as follows :—0·03 cc. to 0·001 cc. of immune serum to 0·2 cc. amoebic antigen and 0·1 cc. of complement. This mixture is incubated at 37°C. with a 5 per cent. sensitized suspension of sheep's corpuscles.

Agglutination experiments were made in Uhlenhuth's tubes with 0·25 cc. immune serum and an equal quantity of amoebic emulsion with their associated bacilli in 0·85 per cent. saline. After incubation at 37°C. for one hour they were examined for macroscopic agglutination and compared with microscopic agglutination preparations and sedimentation tubes. In microscopic slide preparations agglutination was clearly visible, but was not so evident to the naked eye in the macroscopic tubes. It was found that agglutination took place more readily in a 0·6 per cent. saline than in a 0·85 per cent. solution.

With hanging drop preparations and a well triturated amoebic emulsion granular flocculation took place in a few seconds, generally in half to one minute. It would appear that living amoebae are temporarily clumped and their activities suspended on being brought into contact with such immune sera. Amoebae when subcultured for several generations exhibit a marked tendency to spontaneous agglutination. The immune sera produced were specific for the homologous strain of amoebae as well as for the accompanying bacteria. By these means different strains of saprophytic amoebae can be differentiated, not only by their morphology, but also by the specific serological reactions they produce.

Experiments on phagocytosis of amoebae were undertaken with leucocytes derived from the peritoneal cavity of guinea-pigs. It was found that active ingestion of amoebae by phagocytes took place with the smaller, but not with the larger strains of these organisms. Specific immune sera were found to be capable of agglutinating the flagellates derived from one particular strain of amoebae.

[This paper is extremely difficult to follow ; the description of experiments and presentation of protocols appear to be unnecessarily involved.]

P. H. M-B.

Wiener (Emil). **Amöbenfärbung.** [The Staining of Amoebae.] *Arch. f. Protistenk.* 1918. Aug. 10. Vol. 39. No. 1. pp. 105–106.

To obtain good permanent preparations of entamoebae from the stools, the material should be stained immediately after being passed. The following method gives good results :—

(1). Fixation with methyl alcohol.

(2). Five minutes immersion in 1 per cent. tincture of iodine, with frequent washings.

(3). After draining, stain in Löffler's methylene blue for 1½ minutes, wash once again in water and drain.

(4). Stain with a saturated solution of eosin diluted 1 : 3 with water, blot on filter paper.

The differential staining of red and blue gives an appearance similar to that of Giemsa. The details of the amoebae, as well as their nuclei, are stained dark violet, the latter becoming very apparent.

The whole process can be completed in 10 minutes.

P. H. M-B.

i. Marcandier. Trois cas de dysenterie amibienne autochtone chez des mousses du vaisseau-école Magellan.—*Arch. Méd. et Pharm. Nav.* 1920. Mar. Vol. 109. No. 3. pp. 225–230.

ii. Bullrich (R. A.). Amebiasis of the Lung.—*Semana Médica.* Buenos Aires. 1919. Dec. 18. Vol. 26. No. 51. p. 793. [Summarised in *Jl. Amer. Med. Assoc.* 1920. May 15. Vol. 74. No. 20. p. 1428.]

iii. Riff (A.). Sur la présence d'*Amoeba coli* dans un kyste de l'appendice et sur son rôle possible dans l'étiologie de ce kyste.—*C.R. Soc. Biol.* 1920. Feb. 28. Vol. 83. No. 8. pp. 238–239.

iv. Lodge (William Oliver). A Case of Hepatic Abscess. [Memoranda.] —*Brit. Med. Jl.* 1920. Sept. 11. p. 399.

i. Amoebic dysentery can be contracted on board ship by men who have never been abroad. Three cases are described.

ii. Three years after an attack of amoebic dysentery the patient developed pain in the shoulder with fever, cough, bloody sputum, and diarrhœa. Under emetine the condition cleared up. There is little evidence to show that the lung was infiltrated by amoebae. The account reads like an ordinary case of amoebic hepatitis.

iii. Records *Entamoeba coli* in an appendix cyst and discusses its possible etiological rôle in no very convincing manner.

iv. A record of the successful diagnosis of hepatic abscess, subsequent operation and drainage by means of resection of a portion of the 10th rib. A drainage tube was inserted; the patient made a good recovery; no amoebae were found in the aspirated pus.

P. H. M-B.

Bacillary Dysentery.

Manson-Bahr (Philip). **The Commoner Complications of Bacillary Dysentery in Military Practice.**—*Brit. Med. Jl.* 1920. June 12. pp. 791–792.

The complications described are arthritis and, very briefly, iridocyclitis and parotitis.

Arthritis.—This was frequently noticed in the Egyptian and Palestine campaigns. Its incidence seems to have varied greatly in different epidemics. In Indian epidemics Rogers (1913) met with only a single case. Daniels states that in Fiji in 1897 fully 10 per cent. of the patients developed arthritis, but in 1910 the author in the same Colony made a study of 300 cases but saw no instance of arthritis. In the Egyptian cases the bacillus responsible was the Shiga in all cases, though Flexner-Y infections were common enough. The majority of cases had been treated with serum, but arthritis was seen twice in cases not so treated.

Arthritis occurring after the administration of serum is classified thus:—

"(a) Fugitive polyarthritis, with or without joint effusions, occurs during the course of 'serum sickness.'

"(b) Intractable polyarthritis, with effusion into joints and wasting of adjoining muscles, apparently due to absorption of dysenteric toxins."

The fugitive form was seen in 11 out of 29 acute cases injected intravenously with doses of 30 to 40 cc. of antidysenteric serum; it appeared 7 to 12 days later; it lasted as a rule two or three days,

and then cleared up ; it might possibly be ascribed to the elimination of foreign proteins originally contained in the serum injected.

The intractable form occurred in 8 out of twenty nine cases (27 per cent.), with intra-articular effusions, usually between the sixth and tenth day.

" The effusions in my cases took place with surprising rapidity, accompanied by acute pain and a rise of temperature to 102° to 103° F., especially when the knee-joint was involved. The one death in this series was preceded by profuse watery diarrhoea with a septic pyrexia ending finally in collapse.

" In the knee-joint the effusion took place into the sub-crural pouch and, in less than twenty-four hours from the commencement, the joint cavities were distended to their utmost capacity and the superjacent skin was stretched and shiny. There were no signs of local inflammation such as hyperaemia of the adjacent tissues. In the interphalangeal joints the swelling occurred into the tissues immediately surrounding the articulations, thus giving the spindle-shaped appearance of rheumatoid arthritis."

In all the cases the arthritis came on when the intestinal condition had considerably improved. The effusion was sterile on culture. During the prevalence of the joint symptoms there was intermittent pyrexia, and the pain was most in evidence at night time or in the early mornings.

In reply to the question whether the brand of serum employed played any part in the causation of this polyarthritis he notes that his 27 per cent. received a certain brand of serum, whereas among 335 convalescent and slight cases admitted to hospital in the same period who did not get serum there was only one case, and statistics from an Australian General Hospital show that among 358 cases, all treated with large doses of serum, there was no case.

Manson-Bahr thinks that " it is possible that a particularly high percentage of these toxins [of horse serum], even when introduced in moderate doses into a subject already suffering from dysentery in which *per se* arthritis is not an infrequent complication, may not only determine the onset of the condition, but also the amount of disintegration of the joint thus produced."

Iridocyclitis was noted in two cases six weeks after the initial attack of dysentery and parotitis in three cases. In one of the former and two of the latter there was coexisting arthritis.

A. G. B.

VON GOLTZHEIM (Stach.). [**Les arthropathies consécutives aux affections intestinales et spécialement à la dysenterie.**]—*Med. Klin.* 1920. Mar. 28. Vol. 16. No. 13. [Summarised in *Presse Méd.* 1920. Sept. 11. p. 643.]

Struck by the frequency of joint complications in mild attacks of dysentery contracted during the war, this German observer thinks that the intestinal canal is a much more important factor in the arthropathies than has hitherto been considered to be the case. This necessarily has a considerable bearing upon treatment.

The clinical sequence of events much resembles that of acute rheumatism. During the pyrexia several joints are affected, it may be the larger ones, but more often the smaller articulations. The affection

flits in a characteristic manner from one joint to another. The aspirated fluid, according to these observations, is always sterile. At the same time a thickening of the joint capsule is noted together with reddening and local inflammation of the skin. The joint symptoms do not yield to salicylates, nor is the endocardium affected. Dysenteric joints may greatly resemble those of gonorrhoeal arthritis, and may be actually associated with a non-gonococcal urethral discharge. A further distinction is found in the rapidity with which dysenteric arthritis improves at the end of several weeks and in the complete absence of sequelae. Not uncommonly a mucopurulent conjunctivitis as well as an iridocyclitis accompanies the dysenteric arthropathies.

No direct medication would appear to have any action upon the joints; but sand baths at 60° or 45° C. are the most useful, followed later by massage. Treatment should first be directed towards the intestinal condition.

P. H. M-B.

Bentley (James). **Bacillary Dysentery.**—*Med. Jl. Australia.* 1920. Aug. 7. Vol. 2. No. 6. pp. 122–124.

In 1911 bacillary dysentery was recognised amongst the inmates of a lunatic asylum in Western Australia. From an infective point of view bacillary dysentery is to be regarded as in the same category as typhoid fever. In the insane the disease is ushered in by headaches, malaise and pyrexia. There is a definite tenderness over the sigmoid and splenic flexures which is of diagnostic importance. Tenesmus soon becomes a prominent symptom; if the rectum is attacked it is very severe. Should the small intestine be involved, the toxic symptoms are more marked.

The diagnosis of bacillary from amoebic dysentery can be made in the early stages; blood appears much earlier in the former and is of a bright red colour. Stress is laid upon the value of bacteriological diagnosis early in the course of the disease.

Further information is given about treatment; the writer is impressed by the recent work on the necessity of giving intravenous or subcutaneous saline together with anti-dysenteric serum early in the course of the disease. The latter should be given in large doses, at least 60 cc. When given in smaller quantities, 10cc., as was done in 1912 the results were unsatisfactory—13 cases with 6 deaths. It is as important to inject serum in bacillary dysentery as it is in diphtheria.

P. H. M-B.

Denier. **La dysenterie à Saigon.**—*Arch. Méd. et Pharm. Nav.* 1914. Aug. Vol. 102. No. 8. pp. 120–127. [Received Sept. 1920.]

Bacillary dysentery is endemic in Saigon and at Saint-Jacques.

The author of this paper is insistent on all details of technique. Directly a dysentery patient is admitted to a military hospital the local Pasteur Institute is advised by telephone and immediately the necessary sterilized apparatus is sent. It is not necessary to wait for a call to stool on the part of the patient, for he finds that most

dysenterics are able to express a small motion on request. Scarcely half an hour elapses before the specimen is microscopically examined, plated out and a certain number of faecal films stained by the Bouin-Dubosc method. The following is the modification of this fixative :—

Alcohol at 80 degrees with addition of picric acid 1 : 150 ..	45 cc.
Formol	30 cc.
Acetic acid	1 cc.

Fixation is completed in the ice-chest.

The technique adopted for the isolation and identification of the dysentery organism presents no fresh information ; these bacilli were often found associated with amoebic dysentery. Bacillary dysentery is epidemic during the rainy season. These mixed dysenteries are generally of a severe nature, especially in the case of Shiga dysentery.

P. H. M-B.

Morgan (Edward A.). **The Summer's Experience with Infectious Diarrhoea.**—*Canadian Med. Assoc. Jl.* 1920. June. Vol. 10. No. 6. pp. 527–536. With 1 chart in text.

This paper was prompted by the exceptional prevalence of summer diarrhoea in Toronto during the past year. It is less a record of original investigation, than a resumé of the work done upon this subject.

Infectious diarrhoea is a bacterial infection of the mucous membrane of the small and large intestine by organisms, such as *B. dysenteriae*, Streptococcus, *B. coli*, and *B. welchi*. Mild cases of bacillary dysentery may pass unrecognised owing to the absence of pus or blood from the stools. An effort to find an adequate explanation for the increasing prevalence of the disease did not produce much information, but pointed to the existence of dysentery carriers amongst the returned soldiers as a source of infection. Fifty five per cent. of the cases occurred during the months with the highest average maximum temperature of 85°F. The mortality rate was a comparatively low one, 31·6 per cent. The symptoms observed in this epidemic were in no way peculiar ; the onset was generally abrupt ; convulsions were noted in 20 per cent. and blood in the stools in 80 per cent.

As regards the bacteriology, failure to isolate *B. dysenteriae*, Shiga or Flexner from the stools does not mean that this infection can be definitely ruled out. The balance of evidence from cultural and serological tests, as well as from pathological examinations, tended to show that one or other of the dysentery bacilli were the chief factors.

As far as the treatment of infectious diarrhoea is concerned, there are two distinct schools of thought. One school bases its treatment on the exhibition of lactose and on fundamental biochemical and bacteriological principles ; the other on the administration of protein milk. The ideal treatment should aim at the neutralization of specific toxins by the injection of the specific antitoxin, the correction of dehydration by saline and glucose injections, and the inhibition of toxic protein decomposition products by the administration of carbohydrates.

P. H. M-B.

STREMPEL (Rudolf). **Beobachtungen bei Dysenterie.** [Observations on Dysentery.]—*Cent. f. Bakt.* 1. Abt. Orig. 1920. Sept. 27. Vol. 85. No. 1. pp. 68–80.

This long-spun communication deals mainly with the past history of bacillary dysentery, of which a useful summary is given.

The reason for the apparent scarcity of dysentery bacilli in the typical bloody stool is sought in the presence of bactericidal bodies in the blood.

In the damaged gut epithelium all manner of intestinal bacteria can flourish unchecked and we should not necessarily regard these as being in any way specific or diagnostic of dysentery. It is owing to the recognition, often not on very secure grounds, of these many aberrant types that the bacteriological diagnosis of bacillary dysentery has suffered in the estimation of the clinician.

The serum diagnosis of dysentery in reliable hands, and with unquestionable technique, is very valuable. Microscopic or very fine flocculent agglutination is untrustworthy. Macroscopic clumping of the Shiga Kruse bacillus in a titre of 1 : 50 and 1 : 100 for the "pseudo-dysentery" group should be regarded as diagnostic.

For the prophylaxis of bacillary dysentery an energetic fly-campaign should be conducted. HELGERMANN was able during the war to isolate Shiga-Kruse bacilli from the intestinal tract of 40 per cent. of flies caught in the infectious diseases hospital in Warsaw.

As a prophylactic measure the injection of a powerful antitoxic dysentery serum is strongly recommended.

P. H. M-B.

CUNNINGHAM (J.). **Discussion on the Carrier Problem.**—*Indian Jl. Med. Res.* (Spec. Indian Sci. Congress Number 1919). pp. 142–144.

The success of a carrier campaign depends upon two factors :—

(1) The ease with which such infected persons can be discovered and

(2) The practical possibility of segregating such persons. As compared with the typhoid carrier the carrier of bacillary dysentery presents certain differences. In the former the bacillus resides in the gall bladder, while in the latter instance the lesions from which the bacilli are derived are situated in the lower portion of the intestinal canal ; the pathology of the two conditions is quite distinct.

The stools passed by an enteric carrier are normal, while the dysentery carrier is in reality still suffering from the primary disease, and in these cases the excretion of mucus is intermittent, so that a series of stool inspections is necessary to detect all members of the community suffering in this manner. The proportion of latent cases of dysentery to the whole in Indian jails would appear to be 23 per cent.

The possibility of the prevention of the disease by segregation of carriers could be tested in the case of bacillary dysentery on a larger scale than has been tried in other diseases. The success or failure of such a campaign would be an index of the amount of success to be anticipated from the segregation of carriers.

P. H. M-B.

Beitzke (H.). **Der jetzige Stand der pathologischen Anatomie der Ruhr unter Verwertung der Kriegserfahrungen.** [Present Position of the Pathological Anatomy of Dysentery in the light of War Experiences.]—*Deut. Med. Woch.* 1920. May 13. Vol. 46. No. 20. pp. 548–549.

In one-fifth of bacillary dysentery autopsies the last 25–50 cm. of the small intestine were involved, these being the most acute cases. The initial catarrhal inflammation of the mucosa lasts, at the most, 1½ days; the lymph nodes are primarily involved. The necrotic stage rapidly supervenes and is accompanied by haemorrhages and cellular infiltration into the submucosa. The pathological picture varies accordingly as the dysentery virus or the cellular response gets the upper hand.

In the effort to repair the damage which has been done the mucous membrane of the gut presents a very varied appearance, according to the extent of the original necrosis. The whole mucosa may be covered by granulation tissue, or mucoid cysts of the submucosa and polypi may form. The heart in post-dysenteric cachexia is in a condition of brown atrophy; the kidneys show a parenchymatous degeneration. The commonest complications at autopsy are bronchopneumonia, suppurative parotitis and ascending pyelonephritis.

P. H. M-B.

Johnson (J. Guy) **Gangrene of the Caecum and Colon in a Case of Acute Dysentery.**—*Canadian Med. Assoc. Jl.* 1920. June. Vol. 10. No. 6. pp. 564–566.

This is a record of a case of gangrene of the caecum occurring in acute bacillary dysentery. Operation revealed a gangrenous patch, 4 ins. long, in the wall of the caecum and ascending colon; subsequent examination at autopsy revealed the intense inflammation of the mucosa, so characteristic of bacillary dysentery.

Gangrene of the intestine of this nature is occasionally seen in tropical and subtropical countries, but is most unusual in Canada.

P. H. M-B.

Ellinger & Adler. **Die Wirkung von Ruhrgift auf den Kreislauf.** [Action of Dysentery Toxin on the Circulation.]—*Arch. f. Experim. Pathologie u. Pharmak.* 1919. Vol. 85. p. 95. [Summarised in *Arch. f. Schiffs- u. Trop.-Hyg.* 1920. Feb. Vol. 24. No. 1. p. 17.]

The toxin of Shiga's bacillus damages the central nervous system, primarily the thermic and vasomotor centres; the respiratory centre is next attacked. The results of these laboratory studies correspond with those of clinical observations in man, and indicate a symptomatic therapy with injections of caffeine, strychnine, adrenalin, and digitalein.

P. H. M-B.

Ross (S. M.). & Peckham (C. F.). **The Enterococcus as a Factor in Certain Types of Dysentery.**—*Lancet.* 1920. June 26. pp. 1362–1363.

That the enterococcus is very frequently the cause of a severe type of dysentery is not always recognised in England, where this micro-organism has not been studied as abroad.

The organism is an encapsulated streptococcus, most frequently occurring in diplococcal form. It is strongly Gram-positive. In France it is regarded as a very common cause of enteritis in children and adults. The organism is a facultative anaerobe, very virulent to mice, less so to rabbits.

An outbreak of a very severe type of dysentery, with a mortality of 42 per cent., occurred in the Chapel-en-le-Frith workhouse in 1919. The epidemic was connected and coincided with the opening up of the floor of a ward.

The symptoms were those of an acute dysentery; the motions containing blood and mucus were very foul smelling. Direct microscopical examination of faecal films showed large numbers of Gram-positive diplococci closely resembling pneumococci. The enterococcus was easily isolated on lactose-litmus agar. The serum of a case, subsequently fatal, agglutinated the enterococcus as high as 1 : 120.

Two other cases were seen, said to be due to this organism, in which the symptoms closely resembled typhoid fever. One case rapidly improved after inoculation of a vaccine composed of 50,000,000 enterococci.

P. H. M-B.

Sierakowski (Stanislaw). **O powiklaniu czerwonki odmieńcem.—Complication de la dysentérie par bac. proteus.**—*Przegl. Epidemjol.* Warsaw. 1920. Vol. 1. No. 2. pp. 38–43. [French Summary p. 43.]

Sierakowski isolated *Bacillus proteus* 30 times in examination of the stools of 53 dysenterics and the Shiga-Kruse bacillus on 18 occasions. The former series of cases were very severe, the latter very slight. The injection of anti-dysenteric serum even in large doses had no appreciable action.

P. H. M-B.

Monroe (Frazer F.). **Report of a Case of *Bacillus dysenteria* Septicemia, Associated with Bacillary Dysentery.**—*Proc. Med. Assoc. Isthm. Canal Zone.* 1917. July-Dec. Vol. 10. Part 2. pp. 89–90.

An interesting record of the successful isolation of *B. dysenteriae* (Flexner type) from the bloodstream in a patient with mild intestinal symptoms and with but slight constitutional disturbance; the previous case reported by Darling and Bates from the Canal Zone having had very severe clinical symptoms with a fatal termination. The patient, a Jamaican, was taken ill with general febrile disturbances and a temperature of 102° F. Diarrhoea became gradually dysenteriform and from the faeces the bacillus was successfully isolated. Blood culture, which had previously been negative, was once more performed on the 35th day after admission to hospital, during a clinical relapse with return of pyrexia, with the result indicated.

P. H. M-B.

Korbsch (Roger) & Gross (Arthur). **Ueber chronische Bazillenruhr und ihre erfolgreiche spezifische Behandlung.** [On Chronic Bacillary Dysentery and its Successful Specific Treatment.]—*Deut. Med. Woch.* 1920. July 1. Vol. 46. No. 27. pp. 735–736.

The following clinical varieties of chronic bacillary dysentery have been described :—

(1) The chronic ulcerative form in which after a moderately acute primary attack periods of exacerbation with mucopurulent stools occur. Then patients recede slowly into a marasmic state. Sigmoidoscopy reveals inflammatory areas and polypoid outgrowths.

(2) The dyspeptic form in which dyspepsia predominates with passage of mucus-free stools. Sigmoidoscopy in these cases reveals no inflammatory lesions.

(3) The third or pericolic form is much rarer. Minute perforations of the gut-wall lead to inflammatory adhesions in the neighbourhood. The clinical picture is characterised by tenesmus, colicky pains and the passage of muco-sanguineous stools. So far, medical treatment of these clinical conditions has been unsatisfactory. Appendicostomy and caecostomy, if performed in time, have been strongly recommended and it has been said that complete healing of the gut can take place within three months. The two cases under review had suffered from a serious attack of dysentery two and a half years previously ; they both could be classified under the first clinical group and were passing stools containing Shiga bacilli and their serums agglutinated this organism.

Treatment was commenced with intravenous injections of an autovaccine, the initial dose being five million organisms and working up by graduated increases every 4th to 5th day to sixty millions. The results were very striking and were already visible within fourteen days of the commencement. Rigors with a considerable pyrexia seem to have followed upon each injection ; on the subcutaneous route being once more resorted to the improvement was by no means so noticeable.

The healing of the ulcerations and the formation of granulation tissue could be observed to take place by means of repeated sigmoidoscopic examinations. On the strength of this experience the author places considerable reliance on vaccine therapy in the treatment of bacillary dysentery.

P. H. M-B.

Kauntze (W. H.). **A Polyvalent Vaccine in the Treatment of Bacillary Dysentery in East Africa.**—*Jl. of Hyg.* 1920. Feb. Vol. 18. No. 4. pp. 417–447.

This research was carried out between September 1916 and April 1917 while the writer was in charge of the Carrier Depot Hospital, Nairobi. At first it was thought that the disease was amoebic in type and the treatment was limited to the administration of emetine but, as elsewhere in the war areas, the original diagnosis was found to be wrong and dysentery bacilli were isolated quite commonly by Pirie.

As potent predisposing causes to the widespread epidemic the writer recognizes the changes of environment, the change of dietary, and the prevalence of helminthic disease which is considered to be the most important of the three.

As the substitution of salines for emetine did not lower the death rate as it should have done, it was resolved to try the effect of vaccine treatment on the large scale.

The earliest vaccine consisted of B. Shiga and B. Flexner in equal proportions sterilized by the addition of 0·4 per cent. carbolic—a method which completely obviated any serious local or general reaction. In this manner 76,000 porters were inoculated. Later a polyvalent vaccine consisting of eight strains, three of B. Shiga, two of B. Flexner and three of B. Morgan was substituted.

The antidysenteric vaccine consisted of :—

(1)	B. Shiga	500 millions.
(2)	B. Flexner	250 „
(3)	B. Morgan	750 „

Each strain was inoculated separately into a flask containing peptone bouillon, incubated for 72 hours and then killed by the addition of 0·5 per cent. carbolic acid. Each flask was allowed to stand for 48 hours and then tested for sterility.

The conclusions which could be drawn may be stated as follows :— No difference, as far as the death rate is concerned, could be noted between cases which received prophylactic inoculation and those which did not. The real difference between the results is found in the higher proportion of men returning to duty over those who received no prophylactic inoculation. When administered in sufficiently large doses it is the author's opinion that it markedly reduces the death rate from bacillary dysentery. In the pre-vaccine days only 21·32 per cent. convalescents from dysentery were returned to duty, but later experience with large doses of vaccine showed that 75 per cent. of treated cases could be returned as fit.

A dosage of 2 cc. (3,000 million), 4cc. and 8 cc. of vaccine on the first, fourth, and eight days was considered to be necessary. The earlier the vaccine is injected, the better the results.

P. H. M-B.

LEVINE (Max). **Dysentery and Allied Bacilli.**—*Jl. Infect. Dis.* 1920. July. Vol. 27. No. 1. pp. 31–39. With 2 charts.

This paper embodies the result of work performed in the Central Laboratories of the A.E.F. during the latter part of the war.

The object of the research was (1) to differentiate the true dysentery bacilli, universally recognised as pathogenic, from the atypical or dysentery-like organisms (*B. ambiguus*, *B. alkalescens* and *B. dispar*) whose etiological significance is doubtful ; (2) to devise a more dependable medium than nutrient agar for the isolation of dysentery bacilli. The following nomenclature is adhered to—*B. dysenteriae* Shiga corresponds to the original Shiga-Kruse mannite negative type ; *B. flexneri* includes both the *B. dysenteriae* Flexner and Y types. A total of 111 cultures are studied, distributed as follows :—*B. dysenteriae* Shiga, 17 ; *B. ambiguus* 5 ; *B. flexneri* 60 ; *B. alkalescens* 12 ; *B. dispar* 11 ; miscellaneous 6.

(1). Biochemical reactions in a medium containing 1 per cent. of peptone, 0·4 per cent. dipotassium phosphate with 1 per cent. of the test material, indicated that *B. dysenteriae* Shiga, and *B. ambiguus* may be distinguished from *B. flexneri*, *B. alkalescens* and *B. dispar* by

the inability of the former group to produce acid from alcohol mannitol. *B. ambiguus* forms indol and ferments rhamnose.

B. flexneri may be differentiated from *B. alkalescens* and *B. dispar* by the reaction in glycerol and xylose ; the milk reactions also differ.

B. alkalescens can be differentiated with difficulty from *B. dispar* ; the latter rarely ferments dulcite.

The differentiation of varieties of *B. flexneri* on fermentation reactions has fallen into disrepute. Maltose as a test substance should be abandoned, on account of its unreliability. In order to devise a medium for the differentiation of *B. alkalescens* and *B. dispar* from the other dysentery, or dysentery-like strains, the effects of various constituents on the rate of acid production and reversion were studied ; in doing this it was realized that an error can be introduced by distilled water which itself may be slightly acid. It was concluded that with 1 per cent. peptone and 0·4 per cent. dipotassium phosphate, the employment of 0·3 per cent. or more glucose was undesirable for the purpose of differentiating *B. alkalescens* and *B. dispar* from the true dysentery bacilli ; that in the absence of glucose *B. alkalescens* and *B. dispar* form alkali more rapidly than do the true dysentery strains ; that with 0·1 per cent. glucose there is reversion among the true dysentery strains, but *alkalescens* and *dispar* revert much more rapidly ; with 0·2 per cent. glucose reversion among the true dysentery cultures was greatly inhibited. Concentration of peptone did not influence acidity production nor reversion of the true dysentery bacilli nor *B. ambiguus*. The rate of acid production was observed qualitatively by the use of brom-cresol-purple and in some instances with the china-blue rosolic acid indicator ; *B. alkalescens* and *B. dispar* produce acid more rapidly and then revert to a distinctly alkaline reaction.

(2) After many experiments the following medium was evolved as being most suitable for isolation of dysentery organisms—the china-blue rosolic acid mixture being considered the most suitable indicator.

Distilled water	1000 cc.
Agar	15 gms.
Peptone	10 gms.
Dipotassium phosphate	4 gms.

To each 100 cc. of the melted medium is added before use :—

Lactose, 20% solution	5 cc.
Glucose, 5% solution	1 cc.
Rosolic acid (1% in 90% alcohol)	1 cc.
China-blue (0·5% in water)	1 cc.

The H-ion concentration of this medium, which requires no adjustment of reaction and does not need to be filtered when used as plates, is 7·4 to 7·5.

P. H. M-B.

Besredka (A.). **Infection et immunisation par voie buccale contre la dysenterie et les états typhoïdes.**—*Bull. Inst. Pasteur.* 1920. Feb. 29. Vol. 18. No. 4. pp. 121–129.

When a culture of Shiga's bacillus is injected intravenously into a rabbit the virus appears to have a selective affinity for the large

intestine, and the bacilli themselves will subsequently appear in large numbers in the intestinal contents. When injected subcutaneously, the organisms which have escaped destruction in the tissues and the toxins they produce both take the same route and at autopsy can be found only in the bile and in the intestinal canal. Besredka's experiments show that rabbits and mice may be immunised by the mouth and that the protection thus conferred is a permanent one.

Just as the concentration of the dysenteric virus takes place in the intestinal canal, so the immune bodies are developed mostly in the mucosa of the large gut. In a rabbit immunised by administration of vaccines given by the mouth the elaboration of antibodies in the serum is a very feeble one ; the immunity in question develops quite independently of the antibodies in the circulation. The immunity produced by buccal vaccination is a local one and establishes an impregnable line of defence limited to the intestinal canal. Besredka considers that, just as the dysentery virus, by whichever route it gains entrance, is concentrated in the intestinal canal, so the maximum immunity is produced in that region. The buccal route is the commonest channel of infection ; it therefore follows that buccal vaccination affords the greatest measure of security.

The subject of antityphoid and antiparatyphoid vaccination is intimately bound up with the production of these diseases in the lower animals. The peritonitis produced by the injection of these organisms into a guinea-pig bears no resemblance to typhoid infection in man. No animal is known to contract true typhoid, though possibly the larger apes may prove more satisfactory in this respect.

The rabbit is refractory to the enterica group, even when the bacilli are given in massive doses by the intestinal route. The administration of ox-bile to that animal is found to damage the mucosal surface and so to facilitate the entry of these organisms. The results obtained by this method show that, after an incubation period of four days, the stools become diarrhoeic and the animal dies within five days, whether the virus be introduced via the intestinal canal or via the venous route.

In view of the ease with which the rabbit can be sensitised by bile when infected by these organisms, it is clear that the immunity in this animal is limited to the intestinal tract.

No one can doubt the value of antityphoid inoculation during the war, though the protection thus produced is by no means absolute. Enquiries at Bar-le-Duc elicited the useful information that in those individuals who had suffered once from enteric and who subsequently became reinfected, the bacillus could not be isolated by haemoculture, showing that a considerable degree of immunity had been acquired.

The buccal method of immunisation has several obvious advantages ; it is innocuous, efficacious and rapid.

The appearance of antibodies in the serum is by no means an index of immunity, at any rate as regards the intestinal tract. The author therefore advocates the buccal route of immunisation as being the correct one, as one which ensures the vaccine arriving at its proper destination and one which ensures the maximum degree of security.

P. H. M-B.

Jötten (K. W.). **Die Verwendung neutralisierter Antiformin-Bakterienauflösungen zur Gewinnung hochwertiger agglutinierender Ruhrimmunsera.** [Use of Neutralised Antiformin-Bacterial Emulsions in producing Highly Agglutinating Dysentery Immune Sera.]—*Ztschr. f. Immunitätfs. u. Experim. Therap.* 1. Teil. Orig. 1920. Mar. 5. Vol. 29. No. 3-4. pp. 267–276.

Uhlenhuth & Xylander have devised a method of producing, in a short space of time, antisera having a high agglutinating titre by the injection of antiformin-killed cultures of various organisms. This method the author has applied to the dysentery bacilli, thereby producing highly immune sera and at the same time reducing the mortality amongst his experimental animals to a minimum.

It was found that Shiga cultures were killed by the addition of 0·05 per cent. antiformin in a period of 10 minutes; the Y and Flexner types were still more susceptible. Eventually a 2 per cent. addition of antiformin was found to be the most suitable, so much so that a single injection of a large dose of the Shiga organism produced an agglutination titre of 1 in 10,000 within 9 days. The animals generally in use were rabbits, but a donkey, which had previously been used for the production of agglutination sera with cultures of dysentery emulsion killed by heat with unsatisfactory results, produced a serum of 1 : 10,000 by these means without any deleterious constitutional effects.

With Flexner-Y organisms more satisfactory results were obtained and a serum of a titre 1 : 64,000 was obtained; with Schmitz's bacillus results were not satisfactory. After the addition of antiformin emulsions should be carefully neutralised and dechlorinated with 1 per cent. sulphuric acid and 10 per cent. sodium sulphite solution.

P. H. M-B.

Kligler (I. J.). **Note on Cross-Agglutination of *B. coli communis* and *B. dysenteriae* Shiga.**—*Studies from the Rockefeller Institute for Medical Research.* 1920. Reprints Vol. 32. pp. 55–58. [Reprinted from *Jl. of Bacteriology.* 1918. Sept. p. 441.]

The property of reciprocal agglutination was limited to two strains of *B. dysenteriae* (Shiga) and *B. coli* isolated from a chronic typhoid carrier. These cultures yielded on injection into rabbits immune sera possessing agglutinating properties in practically equal quantity for each culture. Absorption experiments made with each culture upon each kind of immune serum indicated that two distinct agglutinins are yielded in about equal amount in the process of immunization. The two agglutinins were found to be specific, each for its own culture, and to contain accessory agglutinins (or para-agglutinins) each for the other culture. The absorption of the accessory agglutinins leaves the specific agglutinins quantitatively unaffected.

The significance of this reciprocal agglutinative property can only be surmised.

P. H. M-B.

Kligler (I. J.) & Defandorf (J.). **The Endo Medium for the Isolation of *B. dysenteriae* and a Double Sugar Medium for the Differentiation of *B. dysenteriae* Shiga and Flexner.**—*Studies from the Rockefeller Institute for Medical Research.* 1920. Reprints Vol. 32. pp. 51–54. [Reprinted from *Jl. of Bacteriology* 1918. Sept. p. 437.]

Previous experience has shown that the dysentery group of bacilli, in respect to their sensitiveness to chemicals, approaches to Gram-positive bacteria or, in other words, departs from the typhoid and paratyphoid groups. Hence the desire so to modify Endo's medium that it will afford colony differentiation and at the same time permit the development of delicate strains of the dysentery bacillus. The modification consists in the substitution of sodium-bisulphite and the accurate adjustment of the hydrogen-ion concentration to a P_H value of 7·6–7·8.

The medium, as ordinarily prepared with a phenolphthalein reaction of + 0·2 gives an end reaction, after the addition of the sodium-sulphite, which is alkaline from P_H 8·4 to 8·8; a degree of alkalinity too great for the growth of the Shiga bacillus.

Either meat-infusion or beef-extract agar may be used as follows:—

Peptone	10·0 gms.
Beef extract	3·0 gms.
NaCl...	5·0 gms.
Agar	15·0 gms.
Water	1000 cc.

All the ingredients, except the agar, are dissolved first; the agar is then added and the mixture autoclaved for one hour at 15 lbs. pressure. It is then cooled to 50° C., white of egg (2 to 5 litres) and steamed for 30 minutes. The reaction is adjusted to P_H 7·4 with phenosulphonephthalein as indicator and the medium boiled for 6 to 7 minutes, filtered and autoclaved. Before forming the Endo plates the reaction is adjusted to P_H 7·6 to 7·8 and the lactose and fuchsin-sulphite added in the usual manner. It has been the experience that 0·8 cc. N. NaOH are required for every 100 cc. of agar.

A mannite-glucose double sugar medium on the principle of Russell's double sugar agar is described for the rapid differentiation of Shiga and Flexner class of dysentery bacilli. The double sugar agar contains 0·1 per cent. glucose and 0·5 per cent. mannite using Andrade's indicator. The selected colonies are stabbed in the butt of the slanted tube and streaked on the surface. Shiga's bacillus gives a slight reddening of the butt, but no change on the surface. The Flexner bacilli and *B. typhosus* colour the entire medium red.

P. H. M-B.

Werdt (Felix) & Kopatschek (Fritz). **Ueber das Verhalten der Ruhrbazillen in eiweissfreien Nährböden.** [The Action of Dysentery Bacillus in Albumin-free Media.]—*Cent. f. Bakt.* 1 Abt. Orig. 1920. Feb. 11. Vol. 84. No. 2. pp. 95–103.

An albumen-free medium was found to be particularly suitable for the growth of dysentery bacilli of which a large number of test strains were utilized.

2 gms. of NaCl, 0·6 gms. of potassium phosphate, 2 gms. of aspartic acid and 0·6 gms. of sodium phosphate are added to 300 cc. of distilled water and stood for 14 hours at room temperature (22°C.). At the end of this time only a portion of the aspartic acid is dissolved ; therefore autoclaving for 1½ hours in a 500 cc. Erlenmeyer flask is necessary. After cooling the fluid is again sterilized for 1½ hours. At the same time five 100 cc. flasks, each containing 10 cc. litmus solution, 0·8 gms. dextrose, maltose, saccharose, and mannite respectively, are steamed for 20 minutes on two occasions in the autoclave. The 300 cc. of the above mentioned fluid is divided into 5 flasks of 60 cc. capacity each, mixed with the sugar solutions and rendered alkaline with 10 per cent. soda solution, of which 4·8 cc. for the dextrose, 4 cc. for the lactose, 4·2 cc. for the mannite, 5·5 cc. for the maltose, and 4·5 cc. for the saccharose solutions are necessary.

The now completed medium is titrated, 3 cc. at a time, into tubes and resterilized on two occasions for 20 minutes.

On sugar media made up in this fashion the reactions of type-strains invariably give the classical and typical fermentative reactions.

P. H. M-B.

Marx (E.) & Eichholz (W.). **Untersuchungen ueber vereinfachte Nährbödendarstellung. (Drigalski-Agar und Barsikow-Nährböden).** [Researches on Simplified Media Preparations.]—*Muench. Med. Woch.* 1920. Aug. 6. Vol. 67. No. 32. pp. 933–934.

This paper embodies an attempt to prepare a reliable medium on the lines of Conradi-Drigalski in compressed tablet form. Nutrose being unprocurable, a substitute had to be obtained. The difficulties of compressing a suitable indicator such as litmus have been overcome. Messrs. Merck are now able to put on the market compressed media such as :—

(a) Ragit-Drigalski-agar with and without crystal violet.

(b) Ragit-Barsikow medium.

In the preparation of Drigalski medium one Ragit-Drigalski tablet is added to each 100 cc. agar in the fluid state.

For Barsikow's medium the addition of two tablets is necessary, one of Ragit-Barsikow and one of a Ragit-sugar compress. To each 100 cc. of Barsikow medium one Ragit-Barsikow tablet dissolved in 100 cc. of water is necessary. The usual precautions for subsequent sterilization of sugar media should be observed.

P. H. M-B.

Hilgers (W. E.). **Ueber die Rasse E (Milchzuckerrasse) der Pseudodysenterie.** [Type E (Lactose Type) of the Pseudodysentery Bacilli.]—*Ztschr. f. Immunitätsf. u. Experim. Therap.* 1. Teil. Orig. 1920. July 26. Vol. 30. No. 1. pp. 77–94.

This somewhat laboured investigation may be summarised as follows :—

By means of standard agglutination and absorption tests the pseudodysentery bacilli found in different epidemics and sporadic

cases may be classified into hypothetical groups varying from A to H.

The type designated E of the pseudodysentery bacilli possesses a high fermentative power for the different sugars, but beyond all others for lactose. The term lactose-fermenter for this type is, therefore, a justifiable one.

The toxicity of this particular race is considerable; though the majority of these organisms are non-toxic, certain races may become active after successive *passage*.

The type E is identical with the Group III of Sonne: it is found for the most part in infants and small children and is the chief factor in the production of infantile diarrhoea (enteritis follicularis).

P. H. M-B.

Fletcher (William). **Capsulate Mucoid Forms of Paratyphoid and Dysentery Bacilli.**—*Jl. Roy. Army Med. Corps.* 1920. Mar. Vol. 34. No. 3. pp. 219–235. With 5 text-figs. & 2 charts.

In the investigation of chronic paratyphoid carriers, curious capsulate bacilli forming large mucoid colonies on Endo's medium, were found. When first isolated these mucoids were not agglutinated by paratyphoid B serum, though they absorbed the homologous agglutinins from it. On further incubation in peptone water, these mucoids are transformed once more into typical paratyphoid organisms; subcultures from the latter behave in every particular like the typical organisms. Mucoid colonies have twice the diameter of ordinary paratyphoid colonies; when viewed by dark ground illumination, numerous coccoid forms can be distinguished. Similar "mucoids" were obtained from cases of Aertryck infection, as well as from Flexner dysentery. The bacilli derived from dysentery mucoids are agglutinated with specific immune Flexner-Y sera.

P. H. M-B.

Metalnikow (S.). **B. dysénterique et bactériophage de d'Hérelle chez les chenilles de** *Galleria mellonella*.—*C.R. Soc. Biol.* 1920. May 8. Vol. 83. No. 16. pp. 667–668.

The caterpillars of Galleria are very susceptible to bacteria of the intestinal flora—*B. coli, V. cholerae,* B. Shiga etc. By injection of an emulsion of B. Shiga in doses of 1/80th cc. death is produced in 15–25 hours.

Experiments were made with the object of ascertaining the protective properties of the bacterophagic bacillus of d'Herelle when injected in small doses (quantity not stated) ten minutes after the initial dose of the Shiga culture. The result showed that a considerable amount of protection was thereby produced. Bacteriolysis of the Shiga bacilli rapidly took place and their remains were engulfed by the phagocytes of the caterpillar, a process which could be observed *in vivo* by colouration with neutral red.

P. H. M-B.

i. Bruynoghe (R.). Les bacilles dysentériques.—*C.R. Soc. Biol.* 1920. May 1. Vol. 83. No. 15. pp. 643–645.

ii. Gegenbauer (V.). Zur Kenntnis der Ruhr des östlichen Kreigsschauplatzes. [The Dysentery of the Eastern Theatre of War.]—*Arch. f. Hyg.* 1919. Vol. 88. p. 219. [Summarised in *Med Sci. Abst. & Rev.* 1920. Apr. Vol. 2. No. 1. p. 77.]

iii. Kraus (R.). Zur Frage der Aetiologie und Therapie der bazillären Dysenterie. [The Question of the Aetiology and Therapy of Bacillary Dysentery.]—*Wien. Klin. Woch.* 1915. Apl. 1. Vol. 28. No. 13. pp. 337–339. [Rec. Apr. 1920.]

i. The author considers that dysentery bacilli cannot possibly be classified upon a fermentative basis. The so-called pseudo-dysentery organisms readily undergo mutation.

ii. This paper contains much that is contrary to generally accepted views. The Galician and Ukranian dysentery appears, for the most part, to have been mild and to have been due to Shiga's bacillus.

iii. The principal form of dysentery in Austria is bacillary in origin. Emphasis is laid upon the necessity of early injection of anti-dysenteric serum as being the best means of cutting short the disease.

P. H. M-B.

Mixed and Unclassed Dysentery.

Ledingham (J. C. G.). **Dysentery and Enteric Disease in Mesopotamia from the Laboratory Standpoint. An Analysis of Laboratory Data during the Eighteen Months ending December 31, 1918.**—*Jl. Roy. Army Med. Corps.* 1920. Mar., Apr. Vol. 34. Nos. 3 & 4. pp. 189–203; 306–320. With 15 charts in text.

This paper contains a careful statistical account of dysentery and enteric disease as observed in Mesopotamia mainly during the year 1917–18. For laboratory purposes dysentery and diarrhoea cases were divided into two groups according to the character, and the naked-eye and microscopical appearances of the motion. The first groups were to those with blood and mucus; the second those with diarrhoeic stools.

In 1917 and 1918 the spring and autumn epidemic attained their maxima in May and November respectively, and the epidemic-free months were in both cases February and March. The incidence of dysentery was invariably greater in British than in Indian troops; the minimal incidence for the former in the month of February being 10·9 per 10,000, and the maximal autumn incidence 85·3 in November, while for Indians the minimal incidence was 5·6 and 21·9 during the same periods.

The charts compiled for the forward area should theoretically provide the best indication of the general course of dysentery prevalence in a fighting force, as the population of the forward area is a homogeneous one and the environment, sanitary and otherwise, is more or less stereotyped. Comparison between the forward area charts and those of the base indicates that here the maxima for British troops occurred in June, a month later than in the forward area, while the autumn outbreak started in October. The incidence of intestinal disease in the Force was returned at a much higher figure when "diarrhoea" and "colitis" were added to the special diseases notification list, ranging, in British troops, from 10·4 to 197 per 10,000 per month; in Indian troops from 8·9 to 75·6 per 10,000 per month. The greatest prevalence of these disorders again tended to occur—in the British at any rate—in the months of May and November.

As regards the nature of dysentery in the Mesopotamian area, the records are particularly complete. The total notifications during 1918 were 25,642, of which 24,667 cases were examined by the laboratories. It is maintained that the results obtained by the Baghdad laboratories can be taken as a fairly accurate guide to the nature of the diarrhoeal disease prevalent among the fighting troops. In work of this kind the role of *E. histolytica* can be very accurately defined, as the vegetative form can be demonstrated by a single examination in well over 90 per cent. of untreated dysenterics examined in the early stages of the disease. It is otherwise with *B. dysenteriae*, in order to isolate which with reasonable prospect of success, it is important to secure samples at the earliest period of the disease. The test of the predominance of *B. dysenteriae* during an epidemic period must be a fall in the percentage of *E. histolytica* cases from the average during the month prior to the epidemic.

The only month in which the amoebic incidence, though minimal, was high in proportion to the general incidence is February, a month in which the figures were very low.

The role of amoebic infection in British troops in Mesopotamia is given as follows :—

	Average general incidence per 10,000.	Amoebic general incidence per 10,000.
Last quarter 1917 ..	83·3	22·0
First „ 1918 ..	15·1	5·53
Second „ 1918 ..	48·5	10·76
Third „ 1918 ..	35·3	10·01
Fourth „ 1918 ..	73·03	16·60

Amongst Indian troops one must note that amoebic infection plays a very appreciably greater rôle, but by this it is to be understood that Indian epidemic dysentery is not, any more than the British, occasioned by *E. histolytica*, but there is no question that the " continued high endemic Indian dysentery " is mainly of amoebic origin in the forward area.

The total amoebic percentage for all cases taken together, that is, diarrhoea, colitis and dysentery works out as follows :—

	British.	Indian.
Baghdad	14·8 per cent.	27·9 per cent.
Basra	24·4 „ „	18·5 „ „

As regards *B. dysenteriae*, great accuracy was observed in diagnosis, as it is recorded that of 2,397 British non-amoebic cases, the stools of 2,235 or 93·2 per cent. were plated out and a diagnosis established in 51·1 per cent. of all blood and mucus cases throughout the year 1918. Cultural results were most successful during the two epidemic seasons and showed a great preponderance of *B. dysenteriae* over *E. histolytica* infections.

Out of 715 isolations of *B. dysenteriae* in British troops B. Shiga was recovered in 45·3 per cent. and B. Flexner in 54·7 per cent.; the former infection predominated in May and October. The case mortality amongst these troops was 1·74 per cent. for 8,275 cases; Indian mortality worked out almost double that of the British.

The relation between fly prevalence and dysentery prevalence is well brought out in the graphs which have been constructed. Practically no flies (as estimated by the fortnightly catches in a Balfour fly-trap) are caught during the first quarter of the year. The first broods appear in the last fortnight of March and the maximal catches are recorded in the last fortnight of April or the first fortnight of May. During July and August—the hottest months—the flies all but disappear, to reappear again in the last fortnight of September, or first fortnight of October.

The autumnal fly prevalence is at its maximum in the first and second fortnight of November. The almost complete disappearance of these insects is not accompanied by any proportionate fall in the dysentery prevalence which returns only to the April level. The author's explanation is that the mass of fresh infection is established in the spring outbreak by the agency of flies; this leaves behind it a large amount of chronic infection which aided by weather conditions seems to maintain the dysentery and diarrhoea incidence at a constant level till the next fly outburst initiates a crop of fresh infections.

Enterica.—There were 734 cases of notified enterica during the fifteen months Oct. 1917–Dec. 1918 of which 46·6 per cent. were bacteriologically confirmed. The proportion of bacteriologically-confirmed enterica was higher amongst the Indian than amongst British troops; for this several reasons are advanced, the main one being the tendency for medical officers of the Indian service to regard the Indian as being relatively immune to this disease. From the period June 1916 to June 1917 the predominant infection was paratyphoid A. From July 1917 to November 1918 the latter infection took a place second to true typhoid. The case mortality in Indians was more than double that in British troops and the disease on the whole ran a grave course. The figures given below are of interest:—

Case mortality.

	British.	Indian.
T. cases..	11·4 per cent.	27·2 per cent.
A. ,, ...	3·6 ,, ,,	11·3 ,, ,,
B. ,, ...	7·5 ,, ,,	16·6 ,, ,,
Clinical Enteric group..	10·0 ,, ,,	20·7 ,, ,,

As regards paratyphoid C Ledingham considers that the organism is allied to para. B, but is distinct in the serological sense.

[Though amoebic infection appears to have been higher in the Mesopotamian area than in other Eastern theatres of war, the general rules guiding the seasonal prevalence of the epidemic and endemic forms of dysentery were essentially the same.]

P. H. M-P.

Woodcock (H. M.). **Note on the Relative Proportions of Amoebic and Bacillary Dysentery among the Troops of the Egyptian Expeditionary Force during the Season of 1917 ; together with some Remarks on the Question of Cyto-Diagnosis.**—*Jl. Roy. Army Med. Corps.* 1920. Feb. Vol. 34. No. 2. pp. 121–130.

The subject matter of this paper is for the most part controversial. It is in effect a friendly criticism of Manson-Bahr's paper on much the same subject [see this *Bulletin*. Vol. 14. pp. 320–322].

The main point would seem to be that in the Egyptian as well as in other theatres of war, the largest number of cases of amoebic dysentery are recognised in the laboratories of base hospitals, or in collecting stations where dysentery cases remain for a sufficient length of time to permit of repeated stool examinations by accomplished protozoologists.

As regards the subject of rapid diagnosis Woodcock is of the opinion that the presence or absence of amoebae (i.e., *histolytica*) is the only *safe guide* on which to base a diagnosis of the type of dysentery from the characters of the stool-sample alone. If *histolytica* is not present in a dysenteric stool the case is, in all probability, bacillary in origin.

P. H. M-B.

Wenyon (C. M.). **A Fallacy in Dysentery Statistics frequently Overlooked.** [Correspondence.]—*Jl. Roy. Army Med. Corps.* 1920. June. Vol. 34. No. 6. p. 560.

In connection with a recent controversial article by Woodcock upon dysentery statistics compiled by Manson-Bahr from Palestine, Wenyon draws attention to the fallacy in dysentery statistics which is frequently overlooked. This fallacy arises from the difference between the two types of dysentery : in the bacillary disease the chances of isolating the organism diminish rapidly after the first two days of the disease, while frequently the blood and mucus disappear as well ; in amoebic dysentery, though the acute symptoms may vanish, the organisms still persist.

The evacuation of dysentery cases from the front to base hospitals takes several days to complete ; therefore, if 100 cases are sent down the the line, by the time they have arrived at the base a large proportion of bacillary cases cease to be recognizable as such and the chances of isolating the organism are practically *nil*, while the amoebic cases will still be harbouring recognizable *E. histolytica*. If only clinical appearance, or positive isolation of organisms, is taken into account, and the history of blood and mucus is neglected, it must happen that the estimate of the proportion of amoebic infections is too high.

Two striking instances of this have occurred during the war : the first outbreak in Gallipoli was regarded as amoebic in origin, mainly because the most numerous routine examinations were made in Egypt, while in Mesopotamia exactly the same factor was in operation. Observers in India maintained from their examinations of returned convalescents in that country that bacillary dysentery was non-existent in Mesopotamia, while the opposite was in reality the case.

P. H. M-B.

Derrieu (G.). **Les dysenteries á Salonique en 1918.**—*Bull. Soc. Path. Exot.* 1920. Feb. 11. Vol. 13. No. 2. pp. 111–117.

The author admits that bacillary dysentery was the most prevalent variety amongst troops in Salonica, but considers that a number of unclassified diarrhoeas were really amoebic in origin and would have been positively identified as such, had more frequent stool examinations been possible.

A distinction is made between *E. histolytica* and *E. tetragena*, though upon what grounds it is not quite clear.

P. H. M-B.

Cope (Zachary). **Hunterian Lecture on the Surgical Aspect of Dysentery. Delivered Before the Royal College of Surgeons of England on Feb. 6th, 1920.**—*Lancet.* 1920. Mar. 13. pp. 579–585.

Dysentery may develop as surgical complications or various surgical conditions may be simulated by dysentery, or again complications needing the surgeon may arise in the case of dysentery.

In long drawn out surgical diseases, as for example chronic suppurative conditions, the onset of dysentery may be terminal.

Dysentery seldom simulates surgical conditions. In those over middle age amoebic dysentery may be mistaken for carcinoma of the rectum.

The surgical complications due to local processes in the intestine may be classified as follows :—(1) Perforation of colon causing a general peritonitis, pericolitis, or pericolic abscess. (2) Acute oedematous localised colitis –typhlitis. (3) Dysenteric appendicitis (4) Extensive sloughing, more generally known as the colon pus-sac. (5) Cicatrisation and stricture of the colon or rectum. (6) Perinephric abscess. (7) Periproctitis.

In the treatment of liver abscess Cope does not think that the method of evacuation matters very much so long as the amoebic infection is also dealt with. This can be done either by injection of emetine into the abscess cavity or simply by the subcutaneous injection of emetine. Very strict aseptic precautions must be observed in dressing a case which has been operated upon by the open method so that sepsis may not supervene.

P. H. M-B.

Leveuf (J.) & Heuyer (G.). **L'intervention chirurgicale dans les formes graves des dysenteries.**—*Paris Méd.* 1920. Apr. 10. Vol. 10. No. 15. [Summarised in *Presse Méd.* 1920. Sept. 8. Vol. 28. No. 64. p. 629].

Surgical interference in acute dysentery which does not yield to medication should aim at (1) placing the colon at rest by deviating the faeces, (2) obtaining the direct action of silver nitrate lavage upon the ulceration of the large intestine.

Caecostomy, an operation easily performed, attains both these objects, and by its means extraordinary results are obtainable. In chronic dysentery with ensuing cachexia the indications are the same. The patient is exposed to the risk of perforation ; moreover, the constant irritation to which the mucosa is exposed does not permit the

intestinal ulcerations to heal and affords a constant channel for the absorption of toxic products. Generally, if no active surgical measures are undertaken, the patient gradually declines into a cachexia from which he may succumb, or he may die from an intercurrent affection such as bronchopneumonia.

In those cases which are benefited to a certain extent by medicinal measures a less heroic operation, namely *appendicostomy*, may be performed and forms a useful adjunct to medicinal treatment. This single operation does not aim at diverting the stream of faecal matter from the large intestine, so much as aiding one in washing out the first portion of the large gut.

P. H. M-B.

Niklas (Friedrich). **Ueber Appendikostomie bei chronischer Ruhr.** [Appendicostomy in Chronic Dysentery.]—*Deut. Med. Woch.* 1920. Sept. 9. Vol. 46. No. 37 pp. 1026–1028.

The material for this paper was derived from the Balkan war zone, where Niklas was working. It cannot be said that appendicostomy with lavage as a curative measure was wholly satisfactory; still it is a considerable aid in the treatment of chronic dysentery. Apparently most cases continue to lose weight for 2 to 3 weeks after the operation.

Fifteen cases were operated on, with two deaths; in only one case did the appendicostomy wound close of its own accord. Of the thirteen remaining patients whose careers were followed, seven were very much improved and could be considered cured. One was lost sight of and five died subsequently from various other causes, such as bowel perforation and influenza.

The indications can be summarised as follows:—Every chronic dysenteric who continues to pass blood and mucus in the stool after 10 weeks of careful medical and dietetic treatment should have appendicostomy performed and the large gut systematically washed out: apparently it matters little what solution is used. It is not justifiable to delay the operation until the condition of the patient has become hopeless.

P. H. M-B.

Glaessner (Karl). **Pankreasstörungen bei Dysenterie.** [Pancreatic Secretions in Dysentery.]—*Wien. Klin. Woch.* 1920. Sept. 23. Vol. 33. No. 39. pp. 859–860.

Disturbance of the gastric functions with diminished acidity and ferment secretion has previously been noted in acute dysentery some eight days after the commencement of the illness, but the effect of this infection upon the pancreatic secretions does not appear to have been investigated. The author of this paper has noticed from observations on both acute and chronic dysentery stools that absorption of albumen is especially deficient. Milk albumens and those derived from meat and eggs pass through the intestine unchanged. He finds that the fault lies in the diminished secretion of proteolytic ferments by the pancreas. The occurrence of hunger oedema in dysentery may possibly be attributable to deficiency of pancreatic secretion in this disease.

P. H. M-B.

Furno (Alberto). **Sulla cura delle coliti emorragiche dissenteriformi.** —*Riv. Crit. di Clin. Med.* 1920. Jan. 25. Feb. 5. Vol. 21. Nos. 3 & 4. pp. 25–30 : 37–41.

The author describes a form of muco-haemorrhagic colitis, dysenteriform in character but unassociated either with the protozoan or the bacterial organism of true dysentery. He treats mild cases of the disease with applications of cold to the abdomen, injections of nitrate of silver solution (1–4000) and the internal administration of tablets of *Elkossam*, apparently a proprietary preparation containing simaruba. More severe cases, which do not respond to this treatment, are given intra-venous injections of peptone (10 cc. of a 10 per cent. solution). The injections are followed by a rigor and rise of temperature : this is however soon succeeded by a marked fall, a great diminution in the number of evacuations and a notable improvement in the patients' general condition. The author maintains that harm is often done in the treatment of dysentery and dysenteriform cases by a too prolonged insistence on a severely restricted diet, with consequent lowering of the patients' resisting power. It is in accordance with this view that peptone injections are given. Clinical histories of cases are given shewing the very rapid effect of the injections.

F. S. A.

Haughwout (Frank G.). **Some Current Problems in Protozoal Dysentery.**—*China Med. Jl.* 1920. July. Vol. 34. No. 4. pp. 343–357.

This work has been directed towards (1) the action of benzyl benzoate on protozoal dysenteries, (2) an investigation of the flagellated protozoa and their capacity for doing harm in portions of the body other than the intestinal tract, (3) an enquiry into the bionomics of the intestinal protozoa.

(1). *Benzyl benzoate.* " Surprisingly good results " have been obtained with this drug ; the distressing symptoms—pain and tenesmus—quickly subside within forty-eight hours. It may be taken with ease, a point in its favour, as it has none of the nauseating properties of ipecac and its alkaloids, nor any depressant effect upon the heart or nervous system. Its use is especially indicated in those rather rare cases of bacillary dysentery complicated by acute amoebic dysentery where it is necessary to treat both conditions simultaneously for " we hesitate to give emetine to a patient who is suffering from bacillary dysentery." The author has been unable to see that benzyl benzoate exerts the slightest influence on any of the intestinal protozoa, except *Entamoeba histolytica* and *Balantidium coli* ; his experience in the latter infection is limited to one single case which, however, was *in extremis* after other forms of treatment had been tried in vain. Up to the time of writing the faeces had been free from these parasites for a week. The author's attitude towards *Giardia intestinalis* is a non-committal one. He thinks that there are certain strains of trichomonads, with an aptitude for ingesting and digesting erythrocytes.

(2). *Pathogenicity of Intestinal Flagellates.* Haughwout believes that trichomonads will, under certain circumstances, leave the intestine and spread to other parts of the body, though he is inclined to

regard their occurrence as probably fortuitous, as far as the parasites are concerned. Numerous trichomonads were recently discovered in the aspirated pleural exudate in a case under his care.

(3). *Bionomics of Intestinal Protozoa.* The result of recent investigations indicates that the therapeutic efficacy of emetine is the result of its action upon the host rather than upon the parasite. Had we more complete knowledge of the life histories of *Entamoeba histolytica* and *Balantidium coli*, and were we able to combine that knowledge with information regarding their daily life and the influence exerted upon them by changing physiological conditions in the host, we might be able to make a start towards the solution of this whole problem. Entamoebiasis and balantidiasis are both rare in Filipino children under fifteen years of age. In some cases hepatic complication with intestinal infection may be deferred for years. One case is recorded in which the number of years was twenty-five.

With reference to the diagnosis of amoebic dysentery by faecal examination the author finds himself forced to admit his inability invariably to make a differential diagnosis and he has to report: "*Entamoeba histolytica* not found; character of the stool suggests amoebic (or bacillary) dysentery. Furnish another *fresh* specimen."

P. H. M-B.

Nisbet (W. O.). **A Case of *Balantidium coli* Infection.**—*Southern Med. Jl.* 1920. June. Vol. 13. No. 6. pp. 403–406.

The case recorded is that of a farmer of 65 years of age, residing in North Carolina, who suffered from intermittent attacks of diarrhoea, with blood and mucus in the stools, in which numerous Balantidia were found. Sigmoidoscopic examination showed numerous rectal ulcers from 5 mm. to 5 cm. in diameter. Rectal injections of 1 : 5,000 of Auratium dye exerted no appreciable effect upon the organisms, though the rectal ulcerations healed.

The discussion which followed upon this paper seemed to indicate that *Balantidium coli* as an intestinal infection in man is by no means so uncommon in the Southern United States as has been supposed; though there appeared to be considerable diversity of opinion upon the exact pathogenic role of the parasite. Dr. Eastland of Texas recorded having seen thirty cases in the last year and a half; he considers that one's chances of discovering the parasite are augmented if one microscopically examines the second stool passed after purgation.

Simon of New Orleans expressed his surprise at the statements of the last observer for from his researches the total number of published cases is 175.

P. H. M-B.

Devic (M.) & Bouchut (M. L.). [Symptoms of Dysentery with Uterus Disease.]—*Arch. des maladies de l'app. digestif.* Paris. 1919. Dec. Vol. 10. No. 6. p. 346. [Summarised in *Jl. Amer. Med. Assoc.* 1920. Apr. 10. p. 1053.]

A fibroma of the posterior wall of the uterus may simulate dysentery. Two cases are here recorded in women of 50 and 43 years of age.

P. H. M-B.

An Apology.

We learn with great pleasure that Dr. C. Bickerton Blackburn of Sydney, President of the New South Wales Branch of the British Medical Association, whose death was erroneously reported [this *Bulletin* Vol. 15. p. 208], is in the best of health.

HELMINTHIASIS.

Rousseau (L.). **Parasitisme intestinal à Douala et dans la région forestière du Cameroun. Nématodes. Protozoaires. Cestodes.**—*Bull. Soc. Path. Exot.* 1919. May 14. Vol. 12. No. 5. pp. 244–258.

During the years 1917–18 the author examined the stools of a large number of sick as well as of 103 other subjects of all ages who were considered to be healthy. All these were from the region of Douala. He found the following percentages of infection :—

62 per cent. Ankylostomes (*Necator americanus* and *A. duodenale*).
40 per cent. *Ascaris lumbricoides.*
33 per cent. *Trichocephalus trichiuris.*

Ankylostomiasis was not present in children under one year though Ascaris and Trichocephalus were quite common.

Oxyuris vermicularis was uncommon, only 2 cases being seen and both these adults.

Among the European population *Taenia saginata* was fairly common but the natives, who seldom ate beef, were free from this parasite. Fifty cases of amœbic dysentery were seen in the two years ; the worst cases were those in which a helminth infection was also present. At two autopsies it was noticed that the points of attachment of Trichocephalus in the caecum and large intestine were also centres of patches of ulceration.

R. T. Leiper.

Jewell (N. P.). **Intestinal Worm Infections of the Nyanza Province.**—*East Africa Protectorate Annual Med. Report.* 1918. Appendix 1. pp. 77–80.

A series of examinations of the stools of natives was carried out during 1918 at the Native Civil Hospital and the Gaol at Kisumu on Victoria Nyanza. The subjects chosen were not only from amongst cases suffering from intestinal trouble but also from cases undergoing surgical treatment and normal healthy persons. The following analysis of the results is given by the author :—

Ankylostoma	49·5 per cent.
Trichocephalus dispar	34·5 ,, ,,
Ascaris lumbricoides	29·5 ,, ,,
Taenia	25·5 ,, ,,
Strongyloides stercoralis	16·0 ,, ,,
Schistosoma mansoni	15·0 ,, ,,
Oxyuris vermicularis	1·5 ,, ,,
Unknown eggs	1·0 ,, ,,

The most interesting points brought out were firstly, the large percentage infected with ankylostomiasis ; secondly, the large percentage of sailors and fishermen who harbour the lateral-spined bilharzia, in some cases with dysenteric symptoms. Some returns are included in the papers showing the incidence of helminth infection among natives in military service. Lieut.-Col. Bligh-Wall ascertained that out of 282 post-mortems at Nairobi worm infection was found in 191 bodies (i.e., 67 per cent.), *A. duodenale* in 12 per cent., tapeworms in 48·5 per cent. and *A. lumbricoides* in 7 per cent. Some of the cases may have been treated for helminthiasis before death.

A series of 600 examinations of faeces made in the Colonial Central Laboratory gave the following percentages of infection :—

A. duodenale	18·8	per cent.
A. lumbricoides	7·5	,, ,,
Tapeworms	7·0	,, ,,
Trichocephalus dispar	5·5	,, ,,
Strongyloides stercoralis	5·3	,, ,,
Schistosoma mansoni	1·0	,, ,,

Dr. KAUNTZE, the bacteriologist, has shown that in a series of 1,000 faecal examinations in the Carrier Corps the series of dysentery cases had a worm infection in 90 per cent., while in effectives and recruits the average was about 67 per cent.

R. T. L.

DA MATTA (Alfredo A.). **Statistique de quelques parasites du tube digestif chez les enfants de l'Etat de l'Amazone (Nord du Brésil).** —*Rev. Méd. d'Hyg. Trop.* 1914–1919. Vol. 11. No. 3–4. pp. 180–182.

Of 883 children in the Amazonas State 635 (i.e., 79·9 per cent.) were infected with helminths :—

Ankylostomes	605	95·2	per cent.
Trichocephalus trichuris	523	52·2	,, ,,
Oxyuris vermicularis	192	30·2	,, ,,
Strongyloides stercoralis	152	23·9	,, ,,
Taenia saginata	3	0·7	,, ,,

A table is also given of the incidence of the species of helminths for each year of age 1 to 12. The presence of *Cysticercus cellulosae* in the muscles of pigs was ascertained on three occasions at the municipal abattoir of Manaos.

R. T. L.

BROSIUS (Otto T.) & BISHOP (William A.). **Diseases due to Intestinal Parasites in Colombia, and their Treatment.**—*Jl. Amer. Med. Assoc.* 1920. June 26. pp. 1768–1773.

Hookworm occurs in 98 per cent. of the inhabitants of the district of Zaragoza, Colombia. No intestinal parasite produces conditions in the human intestine inimical to the life of others. The normal "haemoglobin content" of the native in the region investigated is about 70 per cent. and it is believed that this may prove to be general in all inhabitants of the equatorial belt. The hookworm infested population of Zaragoza has an average haemoglobin per cent. of 47. 98 per cent. of a selected list of apparently chronic hookworm cases showed eosinophilia and the average was 10·91 per cent. in these cases. The unusual symptoms of hookworm disease noticed have been general depression, nausea, vomiting and diarrhoea. Severe abdominal pains are at times traceable solely to the presence of hookworms or ascarides. Several cases of toxic symptoms attributable to chenopodium were observed. These symptoms were nausea, vomiting, general depression and weakness and vertigo with deafness, usually temporary. When permanent the deafness always had a background of syphilis or other preexisting disease. Deaths have been reported,

one case being under the authors' observation. Chenopodium oil always removes most of the worms, viz., about 84 per cent. of hookworm and 88 per cent. of ascarides. With the reduction of the dose to from 35 to 40 minims a single repetition is successful in affecting a cure.

R. T. L.

Haughwout (Frank G.) & Horrilleno (Fé S.). **The Intestinal Animal Parasites found in One Hundred Sick Filipino Children.**—*Philippine Jl. Sci.* 1920. Jan. Vol. 16. No. 1. pp. 1–73. With 1 text-fig.

A thorough examination of 100 young Filipino children was made to ascertain the possible influence of infestation by intestinal animal parasites on infant mortality in the Philippines. These parasites may produce the following effects :—(a) The production of antigrowth vitamines or growth inhibiting substances. (b) The production of substances directly toxic, cytolytic or haemolytic. (c) Unfavourable effect upon the host through the liberation of the products of metabolism of the parasite. (d) Mechanical irritation of the mucous surfaces when present in large numbers. (e) Conveyance of pathogenic organisms from one part of the body to another. (f) Actual invasion and destruction of the tissues with all its concomitants and sequelae. The ether-concentration method of Cropper and Row was used and 32·6 per cent. of the helminth infections which would otherwise have been overlooked were detected by this method. On ten occasions ascaris eggs and five times trichocephalus eggs failed to come down on centrifugation. Positive findings were obtained in 92 per cent. of the children and the incidence of the specific infection is detailed in 21 tables. Breast and artificial feeding does not necessarily confer freedom from parasitism. The effect on the mental development and the nervous system seem not to be specially marked. Abdominal symptoms are striking. The infestations found were wholly due to nematodes. Trichocephalus was the most prevalent animal parasite and occurred in 69 per cent. The authors regard this parasite as potentially harmful and in association with ascaris decidely inimical to the comfort and welfare of children. In connection with ascaris infection in 56 per cent. of the children respiratory diseases other than tuberculosis, influenza and pleurisy were met with in 33 per cent. of the children studied. Hookworm occurred in 12 per cent. of the series. Only one severe case was noted. Cats and dogs are not important factors in the spread of parasitism so far as present knowledge goes.

R. T. L.

Kojima (R.). & Kô (T.). [**Intestinal Parasites of Koreans with a Note on the Distribution of the Liver-Distome.**]—*Chosen Igakkai Zasshi* (*Jl. of Med. Soc. of Korea*). 1919. Oct. 27. No. 26. pp. 42–86.

The paper records the results of the authors' observations on a thousand Koreans living in and around Shinshû of Keishô Nandô Prefecture, including men, women and children.

No single individual out of the thousand examined has been found free from intestinal parasites. Numerous tables are given illustrating the various parasites, density of eggs found in faeces, relation to sexes of the host, geographical distribution, etc. *Trichocephalus trichiurus*, was found in 937 individuals. It affects equally both old and young, but a higher percentage of women than of men. *Ascaris lumbricoides*, observed in 765, was found more abundantly in children than in adults, but decreased as the age advanced. Here also a higher percentage was found in women. *Ancylostoma duodenale*, in 539 individuals, was found in increasing numbers with the age of the host. *Clonorchis sinensis*, seen 442 times, was also more common with advancing age, but there was a sudden decrease after 60 years of age. Other parasites found were : *Trichostrongylus orientalis*, 294 ; *Taenia* (including both *solium* and *saginata*), 72 ; *Metagonimus yokogawai*, 21 ; *Paragonimus westermani*, 20 ; *Ascaris canis*, 8 ; *Oxyuris vermicularis*, 6 ; *Dibothriocephalus latus*, 2 ; *Fasciolopsis buski* (?), 1 ; unknown form, 16. Cases where three different parasites were found in the same individual at the same time were met with in 390 (39·0 per cent.), four different ones in 259 (25·9 per cent.), and two and five in still smaller numbers, 215 and 71 respectively. In very few cases, 11, six different parasites have been found together in the same host.

Clonorchis sinensis is considered with special reference to its geographical distribution, illustrated by an appended map and tables. The highest percentage is seen in Shônei District (80 per cent.). Practically every district of Keishô Nandô Prefecture is infested by the parasite, but generally speaking, smaller percentages are found in the parts near the coast than in the interior.

Hiroshi Ohshima.

Hickey (J. P.). **The Diagnosis of the More Common Helminthic Infestations of Man.**—*Public Health Rep.* 1920. June 11. Vol. 35. No. 24. pp. 1383–1400. With 1 text-fig.

In the United States, with its varied telluric and climatic conditions, there are all the requirements favourable to the spread of certain parasitic infections. It is also likely that endemic foci of disease have been established which will remain undetected until the routine examination of faeces becomes a recognised practice in diagnosis. Out of 8,500 deaths occurring among Chinese in the State of California not a single instance of disease due to helminths or protozoa is given either as the immediate or contributory cause of death. The present paper is designed to present the clinical side of parasitology especially as it relates to the identification of the more common helminths from the detection of their ova in the faeces, sputum, etc. Paragraphs are devoted to laboratory technique, clinical observations and consideration of the various ova. It is stated that occasionally ova are found which are not recorded in literature and a footnote suggests that the eggs of free living nematodes from uncooked green vegetables may appear in the faeces. Polyparasitism is frequently unaccompanied by a high degree of eosinophilia ; in a case quoted the eosinophiles were 6 per cent. of the white cells.

In dealing with the characteristics of the various ova the author states that the only other egg with which *Schistosoma japonicum* might

be confounded is that of *Ascaris lumbricoides*. The eggs of *Paragonimus ringeri* when found in the faeces are of a reddish brown colour while those that are obtained directly from the sputum have a more golden appearance. The author is of opinion that this parasite frequents other organs more often than has been hitherto supposed. Several cases presented moderate hepatic and splenic enlargement with the presence of eggs in the faeces. Lung invasion may be indicated by retraction of either or both supraclavicular spaces in an individual of robust build. Careful digital percussion will reveal impaired resonance. Auscultatory percussion by continuous vibration brings out readily the change in density. The sputum is often greyish brown. The author tabulates the measurements of the ova of five flukes to show that these alone are unreliable guides to identification. The *Fasciolopsis buski* is not considered of pathological importance. The egg of *Fasciola hepatica* resembles it but is slightly larger and more uniformly ovoid. Among the cestodes the *Dibothriocephalus latus* is stated to be a constant cause of anaemia; infections are usually multiple and Koreans, Russians and Japanese have been found infected among immigrants to the United States.

Eggs of Acarina resemble those of nematodes and are occasionally found; the mites also may be found in the faeces. Of the nematode eggs little of interest is said. The shells of the eggs of *Trichostrongylus orientalis* are said to be somewhat plano-convex with a tendency to be pointed at one pole. They measure 0·072 to 0·08 mm. by 0·045 mm.

The important fact is noted that it is difficult, if not impossible, to eradicate *T. orientalis*.

R. T. L.

McLean (Stafford). **Infrequency of Intestinal Parasites in Young Children.**—*Jl. Amer. Med. Assoc.* 1920. June 26. Vol. 74. No. 26. pp. 1774–1775.

The stools of 308 children who visited an outpatient department in New York were examined to determine the frequency of helminth infections among them. The following results were obtained:—

(1) In an examination of 308 stools only 7 or 2·27 per cent. were found to contain ova of helminths.

(2) None of the children examined under 2 years of age were positive.

(3) Of 69 examinations in children 4–12 years of age 4 were positive.

(4) The only ova found were those of *Ascaris lumbricoides* and *Oxyuris vermicularis*.

The conclusion drawn was that intestinal parasites are infrequent in New York City children living under good hygienic conditions.

R. T. L.

Vogel (R.). **Einige Beobachtungen ueber das Vorkommen von Wurmparasiten bei Feldtruppen und Kriegsgefangenen, auf Grund von Fäzesuntersuchungen.** [Report on Findings of Helminthic Parasites in Troops and War Prisoners based on Faeces Examinations.]—*Cent. f. Bakt.* 1. Abt. Orig. 1919. Sept. Vol. 83. No. 6. pp. 456–459.

206 samples of faeces were examined for helminth ova. One hundred of these came from a north German Infantry regiment which

had served on the western front, later in the east and in Serbia and had finally returned to the west. 75 of these were found infested. Eggs of *Ascaris lumbricoides* occurred in 63, *Trichocephalus* eggs in 41; *Taenia solium* twice, *Taenia saginata* once. In three cases the eggs of the *Dicrocoelium lanceatum* were sparingly found.

In fifty stools from a field bakery which was permanently stationed in the west 66 per cent. of positives were detected. *Ascaris lumbricoides* gave 30 per cent., *Trichocephalus* 60 per cent. No other parasites were found. In 56 other cases from Russia and Serbia 50 per cent. were infected. Trichocephalus accounted for 50 per cent. and 14 per cent. Ascaris also occurred.

R. T. L.

Wagner (Gerhard). **Einige seltenere helminthologische Befunde der Kriegszeit.** [Unusual Helminthic Infections observed in War Time.]—*Deut. Med. Woch.* 1919. Aug. 21. Vol. 45. No. 34. pp. 933–935.

While serving in the bacteriological research station at Kiel during the war, the author observed some unusual helminth infections: (a) a *Taenia solium* having a head without hooks. The author remarks that the occurrence of *Taenia solium* is rare in Kiel; (b) eight cases of *Dibothriocephalus latus*; (c) a case of *Schistosomum japonicum* in a sailor who had been in the Far East in 1911.

R. T. L.

O'Connor (F. W.). **A Preliminary Note on Two Intestinal Parasites in Pigs.**—*Med. Jl. Australia.* 1920. Oct. 2. Vol. 2. No. 14. p. 337.

Examination of seven pigs at Funafuti, Ellice Islands, showed that an ovum identical with that of the human ankylostome both as regards measurements and general appearance was of common occurrence in the faeces. From the post-mortem made on one of five infected pigs thirty worms were collected. The larger females were a little more than 0·8 cm. in length, being thus smaller than the human parasite. The males were more slender and slightly shorter. The arrangement of the buccal capsule was similar to that of *A. duodenale.*

The other parasite described is an *Iodamoeba.*

R. T. L.

Gates (William H.). **A Method of Concentration of Parasitic Eggs in Feces.**—*Jl. Parasit.* 1920. Sept. Vol. 7. No. 1. p. 49.

A simple modification of Hall's method of concentrating eggs from faeces is proposed. Faeces is centrifuged first with water, then with sodium chloride or calcium chloride of specific gravity 1250 to remove the bulk of the material and float the eggs free from sediment. The top one or two ccs. are removed by pipette chiefly from the rim of the meniscus. This is centrifuged with water which throws the eggs to the bottom. The water is then poured off leaving all the sediment in the bottom. This is now agitated vigorously and poured quickly into a small dish. Before the eggs have a chance to settle the dish is agitated in a circular direction to form a vortex and practically all

the eggs will be found to have settled within a very small field. They may be observed with a low power or a small quantity of water may be drawn up into a pipette from the centre of the mass of eggs. After holding this vertically for a minute or so the eggs will settle by gravity so that a single drop forced out on to a slide will contain practically all the eggs. The drop can be further diminished in size by the use of blotting paper.

R. T. L.

Kobayashi (S.). [**Resisting Power of the Eggs of Intestinal Parasites (1st Comm.).**]—*Chosen Igakkai Zasshi* (*Jl. of Med. Soc. of Korea*). 1919. July 23. No. 25. pp. 31–36.

Formalin of a strength of 10 per cent. has no inhibiting power against the development of *Ascaris lumbricoides*, *Belascaris marginata*, etc., but it is sufficient to kill the completed young. The same of 20 per cent. sooner or later kills the young, which have been developing inside the egg shell more slowly than those in 10 per cent. solution. Experiments with formalin, 3–10 per cent., diluted with boiled water and covered with fluid paraffin, so as to give eggs the least chance to be in contact with air, resulted in the absolute inhibition of growth in Ascaris, but only a very slow segmentation in Belascaris eggs. The author concludes that the amount of air necessary for the development of Ascaris eggs is extremely small, while the fact that a vigorous growth is found under well-aerated condition seems due to the arrest of putrefaction as suggested by Looss (1911). Eggs of *Ancylostoma duodenale*, *Trichostrongylus orientalis*, *Trichocephalus trichiuris*, *Heterakis* and *Hepaticola* (last two obtained from rat) showed varying degrees of development in formalin.

Hiroshi Ohshima.

Ransom (Brayton Howard). **Synopsis of the Trematode Family Heterophyidae with Descriptions of a New Genus and Five New Species.**—*Proc. U.S. National Museum.* 1920. Vol. 57. pp. 527–573. With 33 text-figs.

The family *Heterophyidae* Odhner 1914 is composed of a number of genera of small flukes parasitic in the intestine of mammals and birds, usually fish eaters, and is one of considerable interest in human and veterinary medicine as several species are of more or less common occurrence in man, dog or cat. The present account of the family includes within it the following genera *Heterophyes*, *Cryptocotyle*, *Centrocestus*, *Ascocotyle*, *Apophallus*, *Pygidiopsis*, *Metagonimus*, and a new genus named in this paper *Cotylophallus*. Formal definitions are given of these various genera and of their component species. The synonymy of several generic names is elucidated. *Coenogonimus* Looss 1899 and *Cotylogonimus* Lühe 1899 are both synonyms of *Heterophyes* Cobbold 1866. *Tocotrema* Looss 1899 and *Hallum* Wigdor 1918 are congeneric with *Cryptocotyle* Lühe 1899. *Loossia* Ciurea 1915 and *Yokogawa* Leiper 1913 give way to *Metagonimus* Katsurada 1913. The genus *Scaphanocephalus* Jägerskiöld 1903, considered by some authorities as belonging to the family, is definitely excluded by the author.

R. T. L.

Ciurea (J.). **Sur la source d'infection du chien et du chat avec l' *Echinochasmus perfoliatus* (v. Ratz) et la question d'infection de l'homme avec les distomes de la famille des Echinostomides. Note Préliminaire.**—*Jl. Parasit.* 1920. June. Vol. 6. No. 4. pp. 173–177.

The source of infection of man with Echinostome flukes has not yet been worked out. In Roumania Ciurea finds that *Echinostoma perfoliatum*, a common parasite of dogs, cats and pigs, is transmitted by fresh-water fish especially *Idus idus* and *Tinca tinca*. Infection also follows from feeding cats and dogs with *Scardinus erythrophthalmus. Abramis brama, Esox lucius, Aspius aspius* and *Blicca björkna*. The author is of opinion that Yokogawa had found encysted Echinostome larvae in the gills of *Plecoglossus altivelis* along with those of Metagonimus but had not recognised them. It seems probable that fresh-water fish may be the source of infection with *Echinostoma ilocanum* and *E. malayanum*.

R. T. L.

Boyd (Mark F.). **A Possible Intermediate Host of *Fasciola hepatica*, L. 1758 in North America.**—*Jl. Parasit.* 1920. Sept. Vol. 7. No. 1. pp. 39–42. With 2 text-figs.

The liver-fluke of sheep, which occasionally infests man, is of cosmopolitan distribution and is well established along parts of the Pacific, the Gulf and the Atlantic coast of the United States. The species of Limnaea in which it is known to develop in other countries do not occur in America, and the uncertainty regarding the North American intermediary has hitherto not been cleared up. From time to time sheep have been grazed on Galveston Island and fluke disease has appeared among them. Three species of mollusc have been found on this island, viz. *Limnaea humilis, Physa fontinalis acuta*, and *Succinea grosvenorii*. Stiles in 1894 suggested that *L. humilis* may be the carrier but this has not yet been established. Experiments were made by the author with artificially reared Physa. Rediae were obtained but the experiments were not sufficiently extensive or prolonged to settle the question finally.

R. T. L.

Guiart. **Observation de distomatose hépatique chez l'homme.**—*Bull. Acad. Méd.* 1920. July 28. Vol. 84. No. 28. pp. 52–54.

A French soldier who had been to Salonika was found, on his return to France, to be suffering from hepatic distomiasis due to *Fasciola hepatica*. The chief symptoms were slight jaundice and pain in the right side with a generalised feeling of weakness. There was a slight rise of temperature at night. Examination of the blood showed a marked leucocytosis with a large percentage of eosinophile cells which rose on one occasion to 54 per cent. No eggs were found in the faeces until calomel had been taken, when they became numerous. Male fern was tried with no result. The only treatment which appeared to have any action was repeated doses of thymol, which caused the number of eggs in the faeces to diminish. The disease had continued for four years.

R. T. L.

GODDARD (F. W.). *Fasciolopsis buski*, **a Parasite of Man as seen in Shaohing, China.**—*Jl. Parasit.* 1919. June. Vol. 5. No. 4. pp. 141–163. With 6 plates & 7 figs.

The prevalence of Fasciolopsis infection in any community will in all probability depend on the dietetic habits of the people. In Shaohing it is extremely common. In the seventeen months from January 1908 to May 1909 infection was ascertained from microscopical examination of the faeces in 5·5 per cent. of all the dispensary patients ; about 2 per cent. more presented very suggestive symptoms and many others doubtless harboured the parasite without having symptoms. During 1914–1916 out of 304 cases admitted to the hospital and in which routine examinations of the faeces were made 28 per cent. were found to harbour Fasciolopsis. Infestation is regarded as a serious disease. Contrary to certain authorities fever is not noted in uncomplicated cases. The author recognises three stages in the clinical picture : (i) The *period of Latency*. A few flukes cause no inconvenience but there is marked difference in the degree of resistance. Probably asthenia in a varying degree and a mild anaemia may appear toward the termination of this stage. (2) The *period of Diarrhoea*. This stage is the one for which relief is most frequently sought. The stool is usually light yellow in colour without evidence of blood even microscopically. The odour is peculiarly offensive and there is a considerable amount of undigested matter. Anaemia becomes noticeable and may be extreme. The combination of anaemia and chronic diarrhoea is in Shaohing practically pathognomonic of Fasciolopsis infestation. Occasionally there is a diffuse dull aching pain in the abdomen or localised to the duodenal region. In children the abdomen is very protuberant. (3) The *period of Oedema*. During this final stage the anaemia is always marked but most prominent and distressing is the oedema. The abdominal cavity is first affected, then the genitals which may be greatly distended, then the lower limbs and finally the arms, face and lungs. To relieve the dyspnoea due to ascites paracentesis abdominis may be necessary every five or six days. The rapid accumulation of fluid in the body may be accompanied by a pronounced suppression of urine without evidence of renal involvement.

The treatment of this condition is the same as for hookworm. Repeated small doses of Beta-naphthol is in practice the best on account of the marked depression following the use of this drug. Fresh-water snails enter largely into the diet of the people in Shaohing and as these are only slightly scalded it is considered probable that one of these may be the intermediary host. The adult-parasite shows great variation in morphology but no such gradations as to justify the inclusion of the forms named *F. rathouisi* and *F. goddardi* in the species of *F. buski*. Ventral cuticular spines are characteristically present in *F. buski*. The cirrus and metraterm are spined and in this respect Fasciolopsis does not conform to RAILLIET's definition of the family Fasciolidae in which it is placed. There is an excellent and very detailed account of the morphology of the parasite.

R. T. L.

Muto (Masatomo). **Ueber den ersten Zwischenwirt von** *Clonorchis sinensis.* [On the First Intermediate Host of *C. sinensis.*]—*Verhandl. der Japan. Path. Gesellsch. Tokyo.* 1918. Apr. 2–4. Vol. 8. p. 151.

A species of fresh-water snail, *Bythinia striatula* var. *japonica* Pilsbury, which occurs in "Biswa" lake harbours three different kinds of cercariae. One of these encysts in *Pseudorasbora parva.* By feeding dogs and mice with this fish experimentally infected a Clonorchis infection of the liver results, while control animals fed with cercaria originating from *Melania livertina* became infested with Metagonimus.

This Bythinia occurs also throughout the province of Okayama. Direct infection experiments with cercariae from *Bythinia striatula* were negative thus indicating that the fish is an essential intermediary. A sporocyst forms in the bodies of Bythinia three weeks after infection with miracidia of *Clonorchis sinensis.*

R. T. L.

Watson (Fred C.). *Clonorchis sinensis* **Infection of the Gall Bladder and Biliary Passages—with Report of a Case.**—*Proc. Med. Assoc. Isthm. Canal Zone.* 1917. July–Dec. Vol. 10. Part 2. pp. 130–135. With 1 plate.

A first case of *Clonorchis sinensis* infection from the Panama Canal Zone is reported. The patient, who was a Chinaman and had been resident in Panama for 20 years, complained of pain in the right side accompanied by nausea and vomiting. Jaundice was present and there was enlargement and tenderness of the liver. Temperature 99°F., pulse 120, respirations 26. The blood count showed 15,000 leucocytes per cmm. with a 5 per cent. eosinophilia. The urine contained bile. Similar attacks had occurred at frequent intervals for 3 years. During the intervals there was general malaise and weakness.

Laparotomy was performed during a severe attack. The gall-bladder was found to be thickened, tense and much inflamed; aspiration revealed the presence of ova of *Clonorchis sinensis*; a few small stones were also removed. The gall-bladder was drained and for several days small plugs of offensive mucus were passed which contained quantities of ova.

Pelletierin (Tanret), 15 cc., was introduced directly into the gall-bladder and allowed to remain for one hour. The same dose of Pelletierin was also given by the mouth with castor oil 1½ oz. Four adult Clonorchis came away in the drainage tube. The sinus closed 19 days after and the patient showed gradual improvement. This however, was temporary and two months later he was admitted to hospital with a recurrence of the symptoms. Diarsenol 0·40 gm. was given intravenously and improvement followed immediately.

R. T. L.

Ando (Ryo). **Experimentelle Forschung ueber den** *Paragonimus westermanni.* [Experimental Research on *P. westermanni.*]—*Verhandl. der Japan. Path. Gesellsch. Tokyo.* 1918. Apr. 2–4. Vol. 8. pp. 151–152.

Encysted cercariae of *Paragonimus westermanni* can survive 11 days, the free cercariae up to 35 days in the gut of frogs. White rats can

become infected with Paragonimus, to which they are very susceptible by feeding with freed cercariae obtained even 72 hours after the death of another warm blooded host, e.g. dog, experimentally fed with encysted forms. In 66 per cent. of crabs a small type of cercariae is found encysted. It measures 0·137–0·316μ and differs from the cercariae of Paragonimus slightly in size and structure.

R. T. L.

Yokogawa (Sadamu) & Suyemori (Susuma). **Observations of Abnormal Courses of Infection of** *Paragonimus ringeri*.—*Jl. Parasit.* 1920. June. Vol. 6. No. 4. pp. 183–187.

Experiments were made to ascertain if the larvae of Paragonimus, freed from their cysts, could infect through the skin, mucous membrane, or any wound on the skin of the host. Details of these experiments are given. The author concludes from them that young active larvae cannot penetrate the sound skin but can infect through a fresh wound. They can also infect the body when taken in by the mouth and the course of invasion follows that taken by encysted larvae under natural conditions of infection. Young lung-flukes just freed from cysts can penetrate the mucous membranes (e.g., the conjunctivae) outside the digestive tract and bore their way through the tissues to the lungs. Other animals cannot be infected by larvae which have already started their development in a definitive host. Partially developed lung-flukes cannot penetrate the mucosa of the digestive tract but can pierce that of the orbits of a suitable host and thereafter reach the lungs.

R. T. L.

Ando (R.). [**Further Notes on Abnormal Ways of Infection of** *Paragonimus westermani*.]—*Tokyo Iji Shinshi* (*Tokyo Med. News*). 1920. Feb. 7. No. 2163. pp. 289–297.

The young set free from the cyst either by means of artificial digestion or by simply putting in water (the latter case takes place in summer) were eaten by albino rats. When these were examined from 20 to 100 days afterwards, only a small number of young distomes were found in a few cases, either inside the thoracic cavity or the lung. Thus out of the 6 rats fed on about 100–400 young, only 3–4 distomes were found in each of 3 cases. This agrees well with Yokogawa and Suyemori's results (1918). [This *Bulletin*. Vol. 16. pp. 126–129.]

Some young were then obtained from dogs which had been infected 20–100 days before, and 12 albino rats and a cat were fed on these, 16–125 young for each. In no case of such artificial change of the final hosts was any distome found developed. In similar experiments, both Kawamura (1916) and the author (1919) have been successful in obtaining a positive result. It seems however extremely difficult for the distome to develop further if removed to another host, after having begun its life in a final host. The author thinks that the young immediately after coming out from the cyst easily penetrate the intestinal wall owing to their small size and also the possession of the spines, while those that have once started life inside the final host have grown larger and their spines have ceased to develop, thus making their passage very difficult through the intestinal wall of the next host.

Hiroshi Ohshima.

Ando (R.). [**The First Intermediate Host of** *Paragonimus westermani*.] —*Tokyo Iji Shinshi* (*Tokyo Med. News*). 1920. May 1–22. Nos. 2175–78. 21 pages & 1 plate.

From among more than 15 species of rediae and cercariae carried by the Melania which live in the district infected by paragonimiasis a particular form of cercaria has through the efforts of Nakagawa, Kobayashi, Miyairi and others been determined to belong to the lung-fluke. But a thorough experimental proof is still lacking. The present author tried to give further proof on the subject (1) by artificially introducing to the crabs, *Potamon dehaanii*, those cercariae supposed to belong to the lung-fluke, and (2) by putting them in natural conditions.

The cercariae in question did not develop further when introduced to the crab through the mouth, and neither the gill nor any wounded surface of the crab afforded the place for the cercariae to penetrate. The cercariae injected through the genital openings of the crab lived and developed as long as 8 days, lost the tail, bent slightly, and further forming a thin membrane around the body. But from difficulty in getting fully developed cercariae to inject and in keeping the crab alive for a long period this experiment could not as yet be made satisfactory.

The next series of experiments consisted in putting the crabs in the pool where the cercariae in question are found abundantly parasitic on Melania, and paragonimiasis is found very frequently all around. Within 10–15 days many of these crabs were found infected by the cercariae, which developed further into the encysted young, as could be found after being kept so long as 169 days. These encysted young were identical with those of the lung-fluke, and some of them were successfully induced to develop into the lung-fluke when introduced into young dogs. In the body of the crab, cercariae were found most abundantly in the trunk muscles, but less in the liver, chelae and legs, while none were found in the gill. The rate of development of the cercariae inside the body of the crab differs considerably according to the temperature.

1. 4th–16th day or 7th–17th day.. ..	Degeneration of tail.
2. 6th–20th day or 19th–31st day ..	Formation of a thin membrane.
3. 14th–23rd day or 47th–57th day ..	Body slightly bent, very easily swollen when put in water, cyst and spines completed.
4. 44th–58th day or 66th–76th day ..	Excretory bladder clearly seen, often yellowish brown granules inside the cyst.
5. 64th–78th day or 92nd–106th day ..	Thick gut seen, young moves actively inside the cyst, which latter breaks very easily.
6. 33rd–45th day or 146th–160th day ..	Nearly completed young, the outer wall of the cyst still thin.
7. 42nd–54th day	Encysted young complete, the cyst consisting of thick double walls.

Hiroshi Ohshima.

Fairley (N. Hamilton). i. **The Discovery of a Specific Complement Fixation Test for Bilharziasis and its Practical Application to Clinical Medicine.**—*Jl. Roy. Army Med. Corps.* 1919. June. Vol. 32. No. 6. pp. 449–460.

——. ii. **Observations on the Clinical Appearances of Bilharziasis in Australian Troops and the Significance of the Symptoms noted.**—*Quarterly Jl. Med.* 1919. July. Vol. 12. No. 48. pp. 391–403.

——. iii. **Egyptian Bilharziasis: Its Recent Pathology, Symptomatology and Treatment.**—*Proc. Roy. Soc. Med.* 1919. Nov. Vol. 13. No. 1. pp. 1–18.

i. The pathological effects of the parasitic metazoa and especially of bilharzia on the host tissue, the ensuing local inflammation and the cellular-humoral response lead inevitably to the conclusion that these parasites and their ova act by the secretion of some soluble toxin rather than by mechanical irritation. In bilharzia the cellular-humoral response in experimentally infected monkeys and in naturally infected man is similar to that observed in other infections. A high percentage of positive results has been obtained by complement fixation reactions according to the technique employed by the author, which is described in detail in this paper. Of 322 consecutive cases of various kinds, 150 gave uniformly negative results. In 36 with bilharzia of less than 2 years' duration 32, or 88·8 per cent. yielded positive reaction. In 97 chronic bilharzia cases of over 2 years' duration, 72, or 74·2 per cent., were positive and in 44 cases of syphilis negative results were registered although all gave positive Wassermann reactions.

Antigen is prepared from infected snail's liver, either *B. mansoni* or *B. haematobia* giving a positive result. A saline extract is made by macerating one liver in 1 cc. of a solution made up of 0·85 per cent. saline and 0·5 per cent. phenol. The mixture is shaken thoroughly on an electric shaker for 20 minutes and incubated at 37°C. for 24 hours. It is then filtered and used fresh as antigen. Alcoholic extract was found to be the most satisfactory. Infected livers were macerated in absolute alcohol, shaken thoroughly on an electric shaker, extracted for 24 hours at 37°C. and filtered. The filtrate was evaporated to dryness at 45°C. with a Sprengles pump. The residue was dried, weighed and shaken vigorously into solution with 0·85 per cent. saline and 0·5 per cent. phenol in the strength of 0·05 gm. of residue to 20 cc. solution. The alcoholic extract may be diluted with the saline without preliminary drying. The anti-complementary dose was then accurately estimated and not more than one-third of this amount was used in the test.

ii. A careful analysis is given of the clinical appearances of bilharziasis as occurring in 75 troopers of the Australian Light Horse who contracted the disease whilst stationed at Serapeum and at Tel-el-Kebir, in Egypt in 1916.

The clinical manifestations are divided into two stages, (a) an early stage occurring 4 to 10 weeks after infection, called the toxaemic stage and (b) a later stage appearing from 3 months to 2½ years after infection, and characterised by localised disease of the bladder or intestine.

The initial toxic symptoms as shown by 7 soldiers infected with *Bilharzia haematobia* while bathing were in five characterised by pyrexia, rigors, frequent sweats, headache and generalised body pains. Urticaria supervened. There was oedema of the face and of the trunk, limbs, penis and scrotum. The rash disappeared abruptly. Emaciation was a feature of the illness and lasted from 10 days to 5 weeks. All the symptoms eventually subsided and the patients returned to duty. During the succeeding three months localised vesical bilharziasis supervened. 50 per cent. of the 75 cases observed presented early toxic symptoms: viz., (a) urticaria and prolonged pyrexia, (b) urticaria and pyrexia of less than 10 days' duration, (c) urticaria alone. 45 cases of pure infection of *B. haematobia* gave the following picture of vesical disease with localised symptoms. In 60 per cent. the earliest symptom was a burning urethral pain on micturition and after one to four weeks a terminal haematuria was noted. In the remaining 40 per cent. there was deep-seated pain, aching in the loins, frequency of micturition and terminal haematuria. The later vesical symptoms, the result of repeated hyperinfection and secondary invasion seen frequently among the Fellaheen, were not observed among the Australian troops. In such cases a mechanical obstruction of the natural passages is followed by cystitis, perurethral and perineal abscesses, chronic septic cystitis, renal insufficiency and eventually death from uraemia.

The clinical picture of intestinal bilharzial infection due to *B. mansoni* is based on 38 cases. Emphasis is placed on the latency, insidiousness and symptomless character of the intestinal type. In the few there was a sense of uneasiness in the rectum with the appearance of blood and mucus in the stool and occasional attacks of diarrhoea. In most severe infections intermittent dysenteric attacks with tenesmus lasted two or three weeks and were accompanied by emaciation. Late manifestations were not seen.

iii. The results already detailed are lucidly summarised in this lecture. An account is given of the successful treatment of 3 cases with intravenous injections with tartar emetic and of the complement fixation-reaction during the course of treatment.

R. T. L.

FAIRLEY (N. Hamilton). **A Comparative Study of Experimental Bilharziasis in Monkeys contrasted with the Hitherto Described Lesions in Man.**—*Jl. Path. and Bact.* 1920. June. Vol. 23. No. 3. pp. 289–314. With 5 plates.

In experimentally infected monkeys at a variable time after the entrance of the cercariae, i.e., from the second to the sixth week, some or all of the following symptoms develop:—Emaciation, muscular weakness, anorexia and perhaps rigors. In hyper-infection death ensued with intensification of these symptoms associated with melaena. If this period was survived these systemic symptoms were followed by a quiescent period and later by localized bilharziasis. In *B. mansoni* dysenteric symptoms supervened from the sixth to the eighth week, but in *B. haematobia* vesical symptoms presented themselves only some time after eggs had appeared in the faeces.

The mode of deposition of ova in the tissues is discussed in detail and the terminal and lateral spines shown to be of value in enabling the egg to pierce the wall of the venules. The localisation of the adult worms in the body differs in the two species: *B. mansoni* are mainly in the branches of the portal, superior and inferior mesenteric veins. *B. haematobia* occur in these situations but in much greater numbers in the pelvic plexuses, especially in the prostatic, vesical and uterine, these situations being reached via the inferior mesenteric vein to the inferior haemorrhoidal plexus. The communication between the pelvic plexuses and the inferior vena cava explains the occurrence of *B. haematobia* in the pulmonary arterioles.

The greatest numbers of *B. mansoni* ova were always found in the colon, liver and small intestine; the maximum deposit of *B. haematobia* ova occurred in the pelvic viscera, especially the bladder and uterus. Large numbers were found constantly in the liver, large bowel, and lung.

The pathological picture in monkeys dying within five weeks of infection are indicative of an acute toxaemia, the brunt of which falls on the parenchyma of the liver, spleen and cortex of the kidney. In monkeys dying after the sixth week and up to the fourteenth week focal lesions now appear, depending on the deposition of ova in the tissues as well as upon the action of the circulating toxin. The two species of Bilharzia produce an identical type of pathological lesion, the difference in pathology lying in their regional distribution. Within three months true adenopapillomata may develop, but the most common lesions are pseudo-tubercles or small whitish nodules varying from 0·5 to 4 mm. in diameter and of widespread distribution.

The liver in infection with both species shows constant morphological changes in monkeys. It is enlarged, dark and congested. The glandular substance as well as the capsule is beset with round or pale coloured nodules composed of disintegrating eosinophils. These lesions are well established in monkeys six to eight weeks after infection and this synchronises with the clinical picture of acute bilharziasis in man, where at this stage there is similarly a large and tender liver. In bilharzial cirrhosis in man there is a generalised cirrhosis, the result of toxic action, and a well marked "pipestem" cirrhosis associated with the presence of ova and the result of prolonged and repeated infection. The lesions in the colon and other abdominal structures are described. The urinary bladder is greatly thickened with bilharzial deposits and the mucous surface beset with papillomatous growths within three months of exposure to infection. The uterus is also studded with tubercles. In *B. mansoni* these lesions do not occur. The lung is extensively involved in *B. haematobia*, not generally in *B. mansoni* infection. In the kidney visible lesions are never met with but there are minute focal lesions as well as degeneration of the renal tubules and congestion of the vessels indicative of a generalised bilharzial toxaemia.

The cellulo-humoral response in experimentally infected monkeys is discussed in detail. There is:—

(1) A strongly positive complement fixation reaction in every case; (2) A leucocytosis varying from 13,000 to 34,000 per cmm. during the fifth to the twelfth week; (3) An eosinophilia from 10 to 63 per cent.

and an average count of 28 per cent. within the same period.—There is a definite relationship between this response and the prognosis. In hyperinfected monkeys dying within five weeks there is a constant leucopenia, absence of eosinophilia and a negative complement fixation reaction. In those surviving the sixth week there is constantly an eosinophil leucocytosis associated with a positive serological reaction.

R. T. L.

Faust (Ernest Carroll). **Criteria for the Differentiation of Schistosome Larvae**—*Jl. Parasit.* 1920. June. Vol. 6. No. 4. pp. 192–194. With 1 plate.

The cercariae of the human schistosome species lack certain details of structure found in the non-human schistosome larvae. The former apparently have no fluted margin to the tail-trunk or furcae. They lack eyespots. They have no pharyngeal sphincter around the oesophagus. Moreover they possess a smaller number of flame cells than has been so far found in other cercariae. The human schistosome cercariae all have an integument entirely covered with spines, a large pyriform oral sucker opening somewhat ventrad. The *S. japonicum* has a conspicuous head-gland, decidedly basophilic in reaction, which is stated by the author to be absent in *S. mansoni* and *S. haematobium*. The most dependable basis of differential diagnosis for these three species is the number and type of mucin glands. *S. haematobium* has only three pairs of glands with corresponding ducts opening strictly lateral to the orifice. The glands have small nuclei and give a simple acidophilic reaction. The *S. mansoni* larvae have six pairs of mucin glands the ducts of which are arranged around the orifice dorsolaterally. In this species two of the glands are acidophilic with large nuclei while four give a basophilic reaction and have small nuclei. This differentiation is based by the author on material from Natal sent by Dr. Cawston. In the case of *S. mansoni* the results correspond both in structural and biochemical tests to material from Venezuela.

R. T. L.

Searle (Charles). **Bilharziasis and Malaria during the Palestine Campaign.**—*Jl. Roy. Army Med. Corps.* 1920. Jan. Vol. 34. No. 1. pp. 15–34. With 1 map in text.

This paper deals with bilharziasis and malaria entirely from the standpoint of the regimental medical officer [This review is confined to that portion dealing with bilharziasis] and deals with the author's personal experiences and observations.

Infected *Bullinus contortus* were found in 1918 during a search for anopheline larvae in orange grove cisterns near Mulebbis, a flourishing Jewish colony near Jaffa. Specimens of this snail were also obtained from a deep well adjacent to a cistern and from a pool near the village of Kafrana. This species was also discovered by Austen in a pool, since obliterated, near El-Jelil. Three cases were traced to the cistern in the orange grove of Madame Pascall and one to another cistern half a mile north of Mulebbis which also contained Bullinus. It was afterwards discovered that the manager of the estate and the native boys working in the gardens all suffered from bilharziasis. The

infected cisterns were treated with cresol, then emptied and labelled "Dangerous to handle this water" and a guard was posted over them. The restricted distribution of Bullinus was puzzling, for the river Auja, the Wadi pools, and the Abuzeitun Marsh were systematically searched but yielded only Limnaea.

The author also deals with an outbreak of bilharziasis among one officer and twenty-one men of the 1/4 Northamptons. From Gallipoli this battalion was moved to Egypt and from Shallufa to Kubri, a desert post on the eastern bank of the canal about eight miles north east of Suez. Nineteen out of the twenty-one cases were definitely traced to bathing and fishing in the Sweet-water canal during the last week of May 1916 just after arrival at this post. On their first arrival the men were warned of the risk of infection; nevertheless nearly eighty men in the battalion bathed on at least one occasion in the Sweet-water canal and nineteen subsequently developed vesical bilharziasis. The remaining three cases derived their infection from a cattle trough at Kubri, the water supplying which was siphoned under the Suez Canal by pipe and was derived from the Sweet-water canal. There were no cases of *S. mansoni* infection. The paper includes histories of typical cases.

R. T. L.

Milton (Frank). **Bilharziasis: Its Incidence and Eradication.**—*Lancet.* 1920. Jan. 24. pp. 196–197.

This paper debates the chief conclusions of a paper published by Mrs. B. S. Elgood and Major T. Cherry [see this *Bulletin*, Vol. 15, p. 218]. The author recalls that "both the molluscan hosts and the cercariae of the Schistosomidae have great capabilities of adaptation, being even able to thrive in the hot springs at Gabes in Tunis, where the temperature is over 40°C." He thinks that it is probable that bilharzia disease has not yet been recognised in Crete. The theory that the festival of Shem-el-Nesim is the occasion of the infection of the population of Cairo when they go out into the country around in vast numbers is interesting, but the opportunities of infection at garden pools, fountains and at the Khalig in Cairo are plentiful throughout the year. The age-incidence of bilharziasis—i.e. its frequency in children and young adults, is practically identical throughout the world and is explainable on the assumption that there is acquired immunity in this disease. He points out that the suggestion that flocks of ducks, if kept in the infected districts, could eradicate the snails overlooks the possibility of the ducks becoming infested with avian bilharziasis [or other trematode infection].

R. T. L.

Kemp (Stanley) & Gravely (F. H.). **On the Possible Spread of Schistosomiasis in India.**—*Indian Jl. Med. Res.* 1919. July. Vol. 7. No. 1. pp. 251–264.

It would appear that very few species of fresh-water molluscs are adapted to act as intermediaries for the various forms of Schistosoma and the species so adapted are not the same for the different species of parasite. None of the species of snails which have heretofore been

cited as intermediate hosts for the schistosomes of man have been found in India and it is improbable that any will henceforth be discovered. Nevertheless this is no reason to discredit the idea that a potential intermediary may exist. Over a hundred men suffering from schistosomiasis were living in the vicinity of Hyderabad in 1918. These men had contracted the urinary type of the disease during service in Egypt. Attempts were made to infect fresh-water snails from the neighbourhood of Hyderabad and Secunderabad. The results were entirely negative. No cercariae corresponding to the larva of any of the human parasite was found in naturally infected snails. Furcocercous cercariae occurred in *Planorbis exustus* in Calcutta which differed conspicuously from those of *Schistosoma spindalis* from the same host in Bombay. A peculiar furcocercous cercaria occurred in *Melania tuberculata* at Trimulgherry. This form did not appear to belong either to the genus or family of Bilharzia.

R. T. L.

Cawston (F. G.). **The Problem of Bilharziasis in South Africa.**—*Jl. Roy. Army Med. Corps.* 1920. May. Vol. 34. No. 5. pp. 439–441.

Cases of bilharziasis treated with tartar emetic injections have all shown improvement or cure but many that have recovered from the direct effects of the parasite are still suffering from complications arising from the disease. In one case, where the ova have disappeared from the urine for several years, the patient is still subject to recurrent haemorrhage from a papillomatous growth of the neck of the bladder which has recurred after successful removal a year ago. Another is suffering from a severe cystitis of several years' duration apparently caused by the presence in the urine of staphylococci, which do not respond to autogenous vaccines. In still another case an intractable *Bacillus coli* infection remains although the ova finally disappeared several years ago.

R. T. L.

Cawston (F. G.). **Schistosomes of Man and Beast in Natal.**—*S. African Med. Rec.* 1920. July 24. Vol. 18. No. 14. p. 264.

The cercariae infesting the fresh-water snails in the Durban suburbs include forms which resemble the larval stage of *Schistosoma haematobium*. Experimental infection of animals resulted in the production of forms which Dr. Leiper identified as *Schistosoma bovis*. This is the first occasion on which the cattle bilharzia has been noted in South Africa. The guinea-pig from which these cercariae were obtained were treated with forktailed cercariae from Physopis on several occasions in October, and in the following February, 22 *S. bovis* were recovered. The author records the discovery of cercariae resembling those of bilharzia in the snail *Isidora* [*Bullinus*] *tropica*. The forms previously found by him as having occurred in rediae in *Isidora schackoi* were named *C. gladii*.

R. T. L.

Cawston (F. G.). **i. Trematodes produced in South African Snails : Encysting Cercariae.** —*Jl. Comp. Path. & Therap.* 1919. Sept. Vol. 32. Part 3. pp. 210–212.

——. **ii. Some Observations on South African Cercariae.**—*S. African Med. Rec.* 1920. Feb. 14. Vol. 18. No. 3. pp. 49–51.

There is no evidence that the somewhat rare *Limnaea truncatula* in South Africa is infested with any species of cercaria. In areas infested with liver-fluke *Limnaea natalensis* is found to harbour "*Cercaria pigmentosa*" and other larval forms. The author says : "there is reason to believe that the parasites which infest the bile ducts of cattle and sheep and are included under the term liver-fluke represent several closely allied parasites."

[Various cercariae described in previous papers are again dealt with but there is nothing new regarding their actual relationship to other recorded cercariae or to infection of man.]

R. T. L.

Faust (Ernest Carroll). **Notes on South African Cercariae.**—*Jl. Parasit.* 1919. June. Vol. 5. No. 4. pp. 164–175. With 1 plate.

The various cercariae which Cawston has recorded and named at intervals during the past four years have been redescribed. The total number of species examined was ten, of which two are named as new forms. The following table for diagnosis of species of human schistosome cercariae is given :—

	S. haematobium.	*S. mansoni.*	*S. japonicum.*
Size.			
Body.	240 × 100 μ	140 × 60 μ	100–210 × 66 μ
Tail trunk.	200 × 47 μ	200 × 27 μ	150 × 20 μ
Furci.	80—100 μ	50 μ	75 μ
Oral sucker.	60 × 64 μ	30–34 × 30–34 μ	33 × 54 μ
Mucin glands.	3 pairs with large nuclei & acidophilic cytoplasm.	2 pairs with large nuclei & acidophilic cytoplasm.	5 pairs with large nuclei & acidophilic cytoplasm.
Mucin ducts.	Moderately thick.	Very thick	Very thick.
Duct openings.	Capped by 3 pairs of hollow piercing spines.	Capped by 6 pairs of hollow piercing spines.	Capped by 5 pairs of hollow piercing spines.
Germ cells.	Several large cells posterior to acetabulum.	Many cells at posterior end of body.	Clustered mass just behind acetabulum.
Parthenita.	Sporocyst.	Sporocyst.	Sporocyst.

Diagnosis of a larval trematode requires exact data on the size and shape, on the integument, on the excretory system, on the digestive system and on the germ cells. [It is remarkable that the author does not succeed in bringing any of the non-bilharzial cercariae into relationship with forms recorded by various writers from other parts of Africa.]

R. T. L.

Cort (William W.). **On the Resistance to Desiccation of the Intermediate Host of *Schistosoma japonicum* Katsurada.**—*Jl. Parasit.* 1919. Dec. Vol. 6. No. 2. pp. 84–88.

In an earlier paper the author showed that specimens of *Blanfordia nosophora* were able to revive after transport in a dry condition from Japan to California. In a new series of observations 85 per cent. of the snails revived and 4 per cent. were found to be infected after a period of five weeks ; after three months however all were found to be dead. Infected snails were less resistant to desiccation. The cercariae were injured and sometimes killed by a length of time in the dry condition from which their hosts could revive. Control of Japanese schistosomiasis would require a period of dryness lasting three months. [This snail has an operculum.]

R. T. L.

Macfie (J. W. S.). **The Occurrence of Lateral-Spined Bilharzia Eggs (*Schistosoma mansoni*) in Urine.**—*Jl. Trop. Med. & Hyg.* 1920. Feb. 16. Vol. 23. No. 4. pp. 45–46.

A specimen of urine from a native man, aged 26, an inmate of the asylum at Accra, Gold Coast, contained bright blood, many eggs of *S. haematobium* and a few eggs of *S. mansoni*. A sample of faeces contained neither blood nor mucus and no schistosome eggs. Half a grain of tartar emetic was injected intravenously as a first treatment, but the patient refused to continue the cure. Nevertheless the urine cleared of blood in a few days and the eggs became scanty. A month later the urine was found to be quite clear, free from blood, and in it there were only a very few terminal spined eggs. Two months later a very few dead eggs of *S. haematobium* were found. The author recalls that Bandi in 1912 saw a single case with mixed infection of the urine in Egypt. [See this *Bulletin* Vol. 1, p. 695.]

R. T. L.

Suzuki (Minoru). **Beitrag zur Kenntnis ueber das Ei von *Schistosomum japonicum*.** [The Egg of *S. japonicum*.]—*Verhandl. der Japan. Path. Gesellsch. Tokyo.* 1918. Apr. 2–4. Vol. 8. pp. 153–156.

The egg of *S. japonicum* is usually elliptical or oval, seldom quite spherical. The size, based on 50 eggs, in faeces, is 0·0708–0·1008 by 0·0510–0·0798 mm., average 0·0846–0·0648 mm. The shell is thick and transparent, 0·0012 mm. thick. The knob-like appendage occurred in 85 out of 100 eggs, in three eggs a local thickening was observable and in eight eggs, no spine could be detected ; in four the results were unreliable. The appendage varies greatly in shape. The author deals also with the contents of the egg, the miracidium, the vacuoles and the covering membrane.

R. T. L.

Fujinami (Akira) & Sueyasu (Moshido). **Eindringen der Schistosomum-Cerkarien sowohl in immune Tiere als auch in Fremdkörper.** (Demonstration). [Penetration of Schistosoma Cercariae into Immune Animals as well as into Foreign Bodies.]—*Verhandl. der Japan. Path. Gesellsch. Tokyo.* 1918. Apr. 2–4. Vol. 8. p. 159.

The cercariae of *S. japonicum* penetrate the skin of naturally immune animals and even into the tissues of some plants.

R. T. L.

Christopherson (J. B.) & Newlove (J. R.). **Laboratory and other Notes on Seventy Cases of Bilharzia treated at the Khartoum Civil Hospital by Intravenous Injections of Antimony Tartrate.**—*Jl. Trop. Med. & Hyg.* 1919. July 15. Vol. 22. No. 14. pp. 129–144. With 4 figs.

Bilharziasis is endemic in all the provinces of the Sudan except the Red Sea Province. It is uncommon north of Khartoum. At Halfa 30 per cent. of the school children are infected. In the Dongola Province the disease is common. Up the Blue Nile and on the Dinder River several of the villages are badly infected. Cases have come from Tagali in the Rashad district of the Nuba Mountain Province where it is said to be common, especially in children. Cases have also been seen from the province of Darfour. The present paper records the treatment of seventy cases by intravenous injections of tartar emetic. In-patient treatment was adopted for forty of these in order to have the patients under observation. The results were practically the same in all cases, some having been under observation for a period of two years. Tartar emetic is a specific cure for bilharzia disease. The mode of giving the injections and the apparatus used are described and illustrated. The skin is sterilised with ether or alcohol in preference to iodine. Injections commence with $\frac{1}{2}$ gr. in about 40 or 50 minims of normal saline solution and take place every other day. It is increased by $\frac{1}{2}$ gr. every time until 2 or $2\frac{1}{2}$ grs. have been reached and this is maintained. In the case of boys under 16 years of age $1\frac{1}{2}$ gr. is the maximum dose. The total quantity injected is 20 or 25 grains. The injections should be given some considerable time before meal-time. Changes are noticeable in the urine : firstly the blood disappears, and the urine becomes clearer within a few days—often as early as the fourth day after about 4 grs. have been given ; secondly on about the 14th day, i.e., after about 20 grs., the urine becomes quite clear and normal. The author meets critisisms made by others on the use of this drug as dangerous as causing tachycardia, cardiac pain and fatty degeneration.

It is observed that antimony tartrate does not appear to have any effect on the parasites of malaria nor on amoebae, flagellata, *Hymenolepis nana*, ankylostoma, oxyuris, ascaris, etc., in the intestines. The results of chemical analysis of the urine in cases treated is tabulated. A very considerable amount of the tartar emetic is apparently eliminated at once and a third of the total over the period of the examinations. This points to an exaggeration in the supposed cumulative effects of the drug. It is claimed that the tartar emetic

can be used as a prophylactic and the disease eliminated if carriers as well as sufferers are treated. Its use in cases returning to uninfected countries is also urged.

R. T. L.

CHRISTOPHERSON (J. B.). **Bilharzia Disease : The Sterilization of the Ova during the Course of Cure by Antimony (Tartrate).**—*Jl. Trop. Med. & Hyg.* 1920. July 1. Vol. 23. No. 13. pp. 165–167.

In this paper the author discusses the dose of antimony required to cure a case of bilharziasis and how the dose is determined. The remarkable disappearance of the ova at an early period of the infection suggests direct action on the ova. The ova may remain plentiful in the urine until nearly 30 grains have been injected. Although the disappearance of the ova is due to the injections this does not determine, in the author's experience, either the dose or the duration of the treatment. An indication is to be found in the sterile condition of the ova passed. When these have become granular, shrivelled, blackish in colour, their double contour lost and the contents sterile for several successive days, the injections may be suspended. Another method may be found in FAIRLEY's complement-fixation reaction where antigen from infected snails is easily obtainable. Eosinophilia may also be studied. This should at first increase but afterwards diminish and, in a case uncomplicated by other parasites, disappear. The author's experience points to the total amount of antimony tartrate as from 20 to 30 grains required for an adult. If the ova cannot be found as a guide the dose is fixed at 25 grs. Larger doses may be given. In the case of a Sudanese boy of 18 years of age suffering from kala azar the author injected 89 grains of antimony tartrate in 115 days. The patient was cured and was fit and well two years later. As a good proportion of the antimony given is eliminated by the kidneys we may assume that toxic effects on the internal organs will be early shown in the urine. A small amount of albumin is of no significance but if this increases the treatment should be suspended. Other symptoms such as jaundice are also contraindications.

R. T. L.

CHRISTOPHERSON (J. B.). **Antimony in Bilharzia.** [Correspondence.] —*Brit. Med. Jl.* 1920. Aug. 14. p. 256.

Two points in dealing with the toxicity of tartar emetic in Bilharzia disease should be borne in mind :—

(1) In bilharziasis the majority of the patients are strong enough to walk about and are able to stand somewhat more drastic treatment than cases of kala azar and trypanosomiasis.

(2) In view of the applicability of a drug to eradication of the disease from a whole country, its use on a large scale and under varied conditions requires that it should be (a) readily procurable and reasonable in cost, (b) stable in tropical climates, (c) easily soluble, (d) colourless, (e) stable after boiling. Tartar emetic would appear to be less toxic intravenously than when given by the mouth. A drug might be sought which could safely be administered by the mouth.

R. T. L.

Christopherson (J. B.). **The Time of Day to Give Antimony Tartrate for Bilharzia.** [Correspondence.]—*Lancet.* 1920. Sept. 4. p. 528.

Injections of antimony tartrate should not be given on a full stomach when the blood is largely engaged in the portal system with the process of digesting a meal. The best time would seem to be 2½ to 3 hours after a light nourishing meal when the circulation has reached its normal equilibrium.

R. T. L.

McDonagh (J. E. R.). **The Treatment of Bilharziasis with Antimony.** —*Jl. Trop. Med. & Hyg.* 1920. July 1. Vol. 23. No. 13. p. 165.

The author was led to use antimony in bilharziasis in 1911 because this metal had proved successful in three cases of sleeping sickness treated in 1910–1911 when it was not practicable to prescribe further injections of arseno-benzene. The first case of bilharziasis was treated with intravenous injections of tartar emetic in 1911 and the author first drew attention to the use of the drug in this disease in his "Biology and Treatment of Venereal Diseases" published in 1915. Antimony acts indirectly on the parasites by stimulating the oxidizing action of the protective substance in the protein particles of the serum. Tartar emetic, antiluetin and colloidal antimony have much the same action but tartar emetic is the most convenient to use. Antiluetin is difficult to obtain and colloidal antimony has to be freshly prepared as it is not stable.

1 to 1½ grains of tartar emetic are put up in ampoules containing 1 cc. of distilled water. "It is best to dilute the contents of one ampoule with water and inject about 100 cc., as concentrated solutions are apt to cause venous thrombosis and temporary mild shock, which is exhibited by violent fits of coughing, feeling of constriction around the neck, with occasional swelling of the lips and tongue. Ten injections prescribed at about 5-day intervals is the average number required."

The author treated 22 cases. Improvement resulted in all. Two of the cases relapsed, nine report periodically and so far have not relapsed. Eleven have been lost sight of. The oldest case was treated eight years ago.

R. T. L.

Cawston (F. G.). **Bilharzia treated with Tartar Emetic.**—*Lancet.* 1920. Aug. 21. p. 392.

The best results in treating Bilharzia with tartar emetic were obtained by giving the injections on alternate days and continuing the treatment for a month. On the first day ¼ gr. is given, on the second ½ gr., on the third ¾ gr. and then on alternate days from 1 gr. to 1½ grs. until 12 grs. to 15 grs. have been given. This is sufficient to effect a permanent cure in the majority of cases. Toxic effects are lessened when the injection is given shortly after a light breakfast.

R. T. L.

Fairley (N. Hamilton). **A Report of Three Cases of Bilharziasis treated with Tartar Emetic.**—*Med. Jl. Australia.* 1919. Dec. 20. Vol. 2. No. 25. pp. 529–532.

A critical investigation of the value of tartar emetic treatment was made in three cases where the treatment was controlled by serological examinations, investigations of the eosinophiles and cystoscopy as well as by the examination of the urine for ova and cellular exudate. The observations showed that beyond all doubt the effect of tartar emetic intravenously in massive doses was beneficial in vesical bilharharziasis. There was a modification of the complement-fixation reaction which certainly proved the lethal action on the worms themselves and is the surest index to such an effect. A temporary increase in eosinophilia followed later by a fall was what one would expect if the drug were acting specifically on the parasites. The practical importance to Australia of an intensive treatment of lightly infected persons is emphasied.

R. T. L.

Low (George C.). **The Treatment of Bilharzial Disease by Antimonium Tartaratum.**—*Jl. State Med.* 1920. Sept. Vol. 28. No. 9. 283–289.

The author believes that the action of tartar emetic in bilharziasis is, as Christopherson claims, to poison the adult worms and that the infection comes to an end with the cessation of fresh egg production. Christopherson's view that it also kills the eggs in the tissues is a matter for conjecture and seems probable. After 5 to 10 grs. in all have been injected in the course of treatment the first clinical results appear; there is a disappearance of blood and a diminution in the number of eggs passed. There is then no recurrence in the discharge of eggs.

Short records of two additional cases successfully treated are appended and are quite similar to those previously recorded by Christopherson and others. The injections were given in a similar manner to salvarsan cases, either by gravity or a large syringe in a concentrated form. The author prefers to use the drug by the former method diluted in 60 cc. of normal saline solution. If a lump forms when the preliminary saline is run in one must not proceed. The antimony injections may be given twice a week. Some give on alternate days. The dose should commence at $\frac{1}{2}$ gr. and be increased up to $2\frac{1}{2}$ grs., which may be regarded as the maximum. The total quantity required in bilharzial disease is 20 to 30 grains in all. There is little or no danger in giving the injections if ordinary care is taken.

R. T. L.

Cawston (F. G.). **Colloidal Drugs in the Treatment of Bilharzia Disease in Young People.**—*Jl. Trop. Med. & Hyg.* 1920. July 15. Vol. 23. No. 14. pp. 180–182.

In bilharziasis up to a teaspoonful of oscol stibium can be given by the mouth three times daily without ill effects. Intramuscular injections are much more effective. Intravenously from 1 to 4 cc. may be given with benefit. Oscol stibium and collosol antimonium

definitely help to clear the urine and blacken the eggs and can therefore be recommended in children to pick up the general health and prepare them for intravenous injections of tartar emetic. Tartar emetic injected intravenously is usually needed to complete the cure and if following a course of oscol stibium or collosol antimonium smaller total doses are required. Several illustrative cases are quoted and details of the treatment given.

R. T. L.

Bonne (C.). **Has Emetine any Influence on the Schistosomes ?**—*Trans Soc. Trop. Med. & Hyg.* 1919. Feb. 21. Vol. 12. No. 4. pp. 82–84. With 1 chart.

The writer gives a summary and a chart showing the results of treatment of 22 cases of *Schistosomum mansoni* with emetine. A series of five injections of one grain of emetine were given subcutaneously. The results were :—

(1). As a rule the eggs disappeared from the stools in one week—in a few cases they did not disappear but were found less frequently and a second course of injections caused total disappearance.

(2). After about two months, sometimes less, eggs reappeared but were made to disappear by a second course of injections.

The author believes that these results show that emetine certainly has an influence on the symptoms of rectal schistosomiasis. It cannot be said that in the dosage used the drug is able to kill off the worms.

R. T. L.

i. Janicki (Constantin) & Rosen (Félix). **Le Cycle évolutif du *Dibothriocephalus latus* L. Recherches éxperimentales et observations.**—Reprinted from *Bull. Soc. Neuchâteloise des Sci. Nat.* 1917. Vol. 42. (Reprint pp. 3–5.)

ii. Janicki (Constantin). **Observations sur quelques espèces de poissons afin d'arriver à connaître plus à fond le contenu de leur estomac et pour trouver des stades encore inconnus du plerocercoïde.** —*Ibid.* (Reprint pp. 6–13.)

iii. Rosen (Félix). **Recherches expérimentales sur le cycle évolutif du *Dibothriocephalus latus*.**—*Ibid.* (Reprint pp. 13–33.)

iv. Janicki (Constantin). **Remarques generales sur le cycle évolutif du *Dibothriocephalus latus*.**—*Ibid.* (Reprint pp. 33–36.)

i. In a brief joint introduction to the two succeeding papers the authors recall the many failures to produce infection of fishes with the embryo of *Dibothriocephalus latus* hatched from the egg. The most recent series of experiments were those by Janicki in 1915–16 and were considered by him to indicate decisively that direct infection could not take place and that a first intermediate host was essential before fish could become infected. In 1916 Rosen had obtained similar results and had arrived at similar conclusions. Two series of observations were then set on foot. Janicki endeavoured to trace the first intermediary by examining the contents of the stomach of fish. Rosen proceeded to eliminate the possible intermediate hosts by experiment.

ii. The contents of the stomachs of young specimens of the known hosts of Dibothriocephalus were searched. In Lota the stomach contents were preponderatingly of Gammarus. In large specimens (15 to 20 cm.) of Perca, Daphnids and Bythotrephes were most abundant; in specimens of 7 to 12 cm. long Daphnids and Bythotrephes often unaccompanied by Copepods. At times Diaptomus and Cyclops occurred. In small Perca (6 to 7 cm. long) the stomach contained chiefly Cyclops and Diaptomus. The stomach wall of Lota from Leman frequently harboured young plerocercoids. Of 82 fishes examined 32 were so infested although in only 9 per cent. of these was the musculature invaded. These plerocercoids averaged from 3 to 5 mm. in length and numbered from one to eighteen in each stomach. In *Perca fluviatilis* gut infection was extremely rare, none occurring in 138 fishes examined. In 25 per cent. however the musculature was invaded. In young perch of 7 to 8 cm. in length during April and May very small larval Bothriocephalus were found. These measured from 0·49 to 0·76 mm. long. Further search led to the discovery of a free larvae 0·68 mm. long on the mucosa of the gut. In the stomach of the specimen from which this was recovered were Cyclops of various species, Diaptomus, Bosmina, and Chironomus nymphs. These new and early stages in the development of the larva were linked up with the positive findings communicated by Rosen and recounted in the succeeding paper.

iii. Rosen, having similarly failed by experiment to infect fish, directly carried out with eggs provided by Janicki a series of experiments designed to secure the infection of some of the various organisms known to form the common food of fishes. Gammarids, larval insects (Chironomus or Corethra) and oligochaetes proved resistant. Daphnids, Leptodora and Bythotrephes also gave negative results. *Cyclops viridis* fed upon the ciliated larvae but digested them. *Cyclops orthonoides*, *C. macrurus*, *C. vernalis* and apparently *C. leuckarti* also remained uninfected. Later, specimens of *C. strenuus* were found to have eight or ten onchospheres in the body cavity. *Diaptomus gracilis* also showed itself to be a susceptible host. Infection occurred less frequently but, when it did occur, the infection was as intense. On the 8th or 9th day after infection the larva has attained a length of 0·2 mm. By the 15th day the larva measures 0·35 to 0·4 mm. and at one pole a spherical knob carries the hooks. After 2 or 3 weeks the larva measures 0·5 mm. and appears now to have obtained its full development within its first intermediary. The name Procercoid is suggested for this stage. Six small *Trutta fario* (7 cms. long) were placed in an aquarium with a considerable number of infected *Cyclops strenuus* and *Diaptomus gracilis* and from sections evidence was obtained that the larvae invaded the gut wall of the second intermediary within six to twelve hours.

The procercoid presents the following characteristics :—

(1). A spherical caudal appendage bearing the embryonic hooks, which disappears sometimes in the Cyclops or Diaptomus, sometimes in the gut of the fish.

(2). A protractile terminal invagination.

(3). A glandular formation opening into two.

(4). A covering of spines which disappear in the stomach wall of the piscine host.

(5). A sparse number of calcareous bodies in the granular parenchyma. By the digestion of the infected Cyclops or Diaptomus the procercoids are liberated in the stomach or intestine of certain fishes in which after traversing the gut wall they become transformed into plerocercoids. They pass from the gut wall into the body cavity and thence to the musculature or to the liver.

iv. In some concluding remarks Janicki draws attention to the striking resemblance between the procercoid and *Archigetes sieboldi*. The *Sparganum mansoni*, *Plerocercoides prolifer* and a number of other "species" of Sparganum and Dithyridium are plerocercoid stages of development and must have an unknown procercoid phase.

R. T. L.

Rosen (Félix). **Recherches sur le développement des Cestodes. 1. Le cycle évolutif des Bothriocéphales. Etudes sur l'origine des Cestodes et leurs états larvaires.**—*Bull. Soc. Neuchâteloise des Sciences Naturelles.* 1918. Vol. 43. pp. 1–55.

Janicki (Constantin). **Der Entwicklungscyklus von *Dibothriocephalus latus* L. Offene Antwort an meinem früheren Mitarbeiter Herrn Dr. F. Rosen. Zugleich ein Beitrag zur Methodologie eines helminthologischen Problems.** 33 pp. 1919. Sainte-Croix. Imprimerie Georges Jeanrichard.

In this communication an account is given of the life history of the *Dibothriocephalus latus* in its intermediary hosts. The preliminary report [see above] is supplemented with many new details. At a temperature of 16 to 20°C. the eggs of *D. latus* hatch in from 8 to 15 days. The ciliated body which emerges is called the "coracidium." This is swallowed and digested by various daphnids and species of Cyclops, e.g., *Cyclops viridis*, *C. orthonoides*, *C. macrurus*, *C. vernalis* and *C. leuckarti*, but in *Cyclops strenuus* and in *Diaptomus gracilis* the ciliated larva of *D. latus* penetrates the stomach wall into the body cavity where it is attached to the outer wall of the intestine by its hooks. Six hours after the coracidia have been swallowed by the cyclops the larvae have traversed the gut wall. After 12 to 15 days the larva is about 0·4 mm. long, sausage-shaped, with a spherical pedicle carrying the embryonic hooks. When the larva is from 0·5 to 0·6 mm. long this appendage withers. At the opposite pole a depression slowly forms. Within the body a pyriform central mass formed of special cells now develops and occupies about three-fourths of the body. The whole development of the onchosphere in this, its first intermediary host, is completed within two or three weeks, the parasite having grown in size from 24μ to 0·5 to 0·6 mm. To this stage of development the name *Procercoid* is given. Small trout were successfully infected with plerocercoids by feeding them on infected Cyclops. The passage of the procercoid through the gut wall into the coelomatic cavity and into the viscera is a slow one. Procercoids were found in the liver on the sixth day after infection, but in older fishes the process of invasion may take from a fortnight to a month. The parasite increases in size and retains most of the characters of the procercoid, but two suckers develop. It is now called a *Plerocercoid*.

An account is also given of the development of *Triaenophorus nodulosis*, an adult tapeworm of the pike, in *Cyclops strenuus* and *Cyclops fimbriatus*. *Abothrium infundibuliformis*, an adult parasite of *Trutta lacustris*, develops in *Cyclops strenuus* and *C. serrulatus*. The paper concludes with a discussion of the bearing of these results on theories of the origin of the cestodes. There is an additional note at the end dealing with Janicki's participation in the inquiry and the relation of his studies to these discoveries, to which Janicki's paper is a reply.

R. T. L.

Leon (N.). *Dibothriocephalus taenioides* **Leon, a New Case in Roumania.** —*Jl. Parasit.* 1920. Sept. Vol. 7. No. 1. pp. 43–45. With 3 text-figs.

The parasite described and illustrated in this paper was obtained from a patient sixty years of age, who had suffered for some time with vague intestinal pains and especially with a painful morning diarrhoea. On some days there were five or six evacuations accompanied by particles of mucus and even of whitish masses like coagulated white of egg. There was no anaemia either in this or in other cases. A fortnight after the expulsion of the worm the diarrhoea had disappeared. Dr. Bacaloglou, who attended the patient, is of opinion that "the phenomena of mucomembranous entero-colitis are certainly related to the parasites that he harboured." The parasite is the same as that first recorded by the author in 1916. The ripe joints are always longer than broad. The largest segments hardly reach 6 mm. but the major part are narrow as in *D. parvus* Stephens. They differ from the latter in that these although very narrow are also very short. The form of the uterine rosette is characteristically bi- or tri-cornuate and the coils filled with eggs number only two or three. The longitudinal and circular musculature is markedly reduced, so the worm is very slender. In colour the worm is a characteristic ashy yellow. The head, neck and the young part of the strobila is lacking. The part evacuated measured 82 cm. but the widest segments hardly measure 6 mm.

R. T. L.

Riley (William A.). **The Longevity of the Fish Tapeworm of Man,** *Dibothriocephalus latus.*—*Jl. Parasit.* 1919. June. Vol. 5. No. 4. pp. 193–194.

Two cases of Bothriocephalus infection occur in the clinical records of the University Hospital, Minneapolis, Minnesota, which throw some light on the duration of infection. In the first case eggs were detected in the faeces and after appropriate treatment a complete specimen of *D. latus* was evacuated. The patient was a Russian Jew who had left Russia some five years previously. In the second case, a Swedish woman, a high degree of esinophilia was noticed and the presence of parasitic infection established by the subsequent finding of large numbers of eggs in the stool. After treatment a specimen of *D. latus* was expelled and the eosinophilia dropped from 25 per cent. to 2·8 per cent. The patient, now aged forty three years, had had these worms since she was fifteen years old. At the age of twenty nine

she left Sweden for the United States and had lived for two years in Brooklyn, three years in Michigan, three years in Wisconsin and five years in Minnesota.

R. T. L.

Nickerson (W. S.). **The Broad Tapeworm in Minnesota. Further Facts and Considerations.**—*Jl. Amer. Med. Assoc.* 1920. Feb. 14. Vol. 74. No. 7. pp. 457–458.

Four cases of infection by *Dibothriocephalus latus* are cited, all occurring in patients who had never been out of Minnesota. There is reason to believe that this tapeworm is as common in this district as the other tapeworms of man, but it is probably overlooked owing to the lack of knowledge of the attending physicians.

The author lays stress on the need for a central clearing-house for all such cases, under the supervision of a trained zoologist, on whom would fall the task of receiving, classifying and reporting on all human parasites sent for diagnosis.

R. T. L.

Chandler (Asa C.). **A New Record of *Taenia confusa*, with Additional Notes on its Morphology.**—*Jl. Parasit.* 1920. Sept. Vol. 7. No. 1. pp. 34–38. With 1 plate.

Only two specimens of this parasite of man have hitherto been recorded and both records are for North America. The specimen described in this paper was apparently collected in Texas and in some details bridges the gap between *Taenia confusa* and *T. brenneri*, and the author proposes to regard *T. brenneri* as a synonym of *T. confusa* pending further details. The head of *T. confusa* as originally described apparently was that of a Dipylidium. The strobila was however that of a true taenia. In the present case the head has a characteristic unarmed scolex sharply demarcated from the neck and has no resemblance to Dipylidium. The strobila comprised 790 segments: the great majority were longer than wide. The terminal segments measured from 25 to 33 mm. by 6 to 8 mm. The vagina has the peculiar features described for *T. confusa* by Guyer. The most salient feature of the ripe uterus is the great irregularity of the short, deeply subdivided branches which frequently become constricted at the point of emergence from the main stem. The uterine eggs measure 33μ x 42μ, and there is a distinct pyriform apparatus in the form of two short filaments attached to the thin outer shell.

R. T. L.

Hasegawa (Tsuneji) & Yamanouchi (Junichi). **Beitrag zur Kenntnis von *Hymenolepis nana*.** [Contribution to the Knowledge of *H. nana*.]—*Verhandl. der Japan. Path. Gesellsch. Tokyo.* 1918. Apl. 2–4. Vol. 8. pp. 162–163.

The eggs of *Hymenolepis nana* were found in the faeces of 5 out of 7,094 Hospital patients. In a case where there were hundreds of parasites the strobila comprised about sixty segments. In one parasite however 200 segments occurred. The eggs seen in the stool are stated to have measurements exceeding those generally given in the text-books. A typical egg measured 0·0571 by 0·0445 mm. The authors mention a case from which 4,078 parasites were obtained.

R. T. L.

Arnozan (X.). [**Thymol for Expulsion of Tapeworm**].—*Jl. de Méd. de Bordeaux.* 1919. May 25. Vol. 90. No. 10. p. 187. [Cited in *Jl. Amer. Med. Assoc.* 1919. July 19.]

A note of success in sixty cases of tapeworm treated by thymol. A cachet of 25 centigrammes of thymol was given every morning for 6 days, the patient to abstain from alcohol, fat and oil during the whole treatment. The worm was generally expelled during the third or fourth day. For a child of 4 years 15 centigramme is considered sufficient and is harmless.

R. T. L.

Parisot (Jacques) & Simonin (P.). **Toxicité et action sur les appareils circulatoire et respiratoire de l'extrait total de** *Taenia saginata*. —*C. R. Soc. Biol.* 1920. June 19. Vol. 83. No. 21. pp. 937–939.

Considerable cardio-vascular distress with variability of blood pressure and pulse rate followed the injection of extracts of *Taenia saginata*. Two methods of preparing extracts are given :—(a) from freshly passed segments, (b) from dried segments. Intravenous injections of either extract into rabbits produced the same results. It was noticed that an extract of the mature segments of the worm had a greater toxicity than that obtained from young segments near the scolex.

R. T. L.

Parisot (Jacques) & Simonin (P.). **Effets sur l'intestin des injections d'extrait total de** *Taenia saginata*.—*C.R. Soc. Biol.* 1920. June 19. Vol. 83. No. 21. pp. 939–941.

Varying doses of an aqueous extract of the segments of *Taenia saginata* were injected intravenously into rabbits. In those receiving a small dose (1 cc.) an immediate attack of diarrhoea resulted. A stronger dose (5 cc.) caused respiratory and circulatory disturbances, a more intense diarrhoea with the passage of mucus and blood, and finally a speedy death. Microscopical examination of sections of the intestine showed that the mucosa of the intestine was entirely destroyed and washed away leaving bare the muscularis mucosae in which haemorrhages and masses of leucocytes were present. These experiments throw light on certain intestinal troubles and diarrhoea frequently observed in patients suffering from worm infection.

R. T. L.

Watkins-Pitchford (W.). **Parasitized Kabeljaauw and Cape Salmon.** —*Med. Jl. S. Africa.* 1919. Dec. Vol. 15. No. 5. pp. 101–104. With 2 text-figs.

Obvious parasitic cysts are frequently present and in some instances in large numbers in two of the staple food-fishes of South Africa, viz., the "kob" or kabeljaauw (*Sciaena aquila*) and the Cape salmon. Invalids in particular are prone to detect this parasite and to ask if the flesh is wholesome as food. The parasite is identified as probably *Tetrarhynchus erinaceus*. The cyst is ovoid or spheroidal, 2 to 8 mm. in longest diameter, of opaque white appearance and tough consistence. A "tail" projects for 8 mm. or less. The head of the cyst carries two bilobed suckers and four long slender proboscides

covered with large and small recurved hooklets. The author considers that from the economic standpoint it is quite unjustifiable to condemn infected fish. The objections to its use are entirely sentimental and aesthetic. In the discussion following the paper the author remarks that he does not agree with the generally accepted view that the cysticerci of *Taenia saginata* are of rare occurrence in man and mentions three cases which have recently come under notice of the South African Institute for Medical Research in Johannesburg.

R. T. L.

Sinton (J. A.). **A Trematode Parasite of Anopheline Mosquitos.**—*Indian Jl. Med. Res.* 1917. July. Vol. 5. No. 1. pp. 192–194. With 1 plate.

During the dissection of mosquitoes for malaria parasites an encysted trematode was found in a number of specimens of *Anopheles funestus* var. *listoni*, *A. culicifacies* and *A. stephensii*. The parasite occurred in both males and females and was also found in the larvae of *A. culicifacies* and *A. willmori*. In each specimen the number varied from one up to 250. A good description and set of illustrations are given. The parasite seems to be similar to that described for European countries. Its definitive host may be the bat or some bird with aquatic habits which feeds on insects, such as the wag-tail.

R. T. L.

Danulesco (V.). **Sur le mécanisme de la guérison spontanée des kystes hydatiques pulmonaires.**—*Bull. et Mém. Soc. Méd. Hôpit. Bucarest.* 1920. Mar. 3–17. Vol. 2. No. 4–5. pp. 176–180. With 4 text-figs.

A case of hydatid cyst of the lung is described in which a correct diagnosis was arrived at by X rays. A spontaneous cure took place after an attack of pneumonia, the cyst being killed by the invasion of pyogenic organisms. Radiographs of the affected lung 6 weeks after showed that the cyst had been entirely replaced by normal lung tissue.

R. T. L.

Coorlawala (R. N.). **Two Cases of Abdominal Hydatid Cysts.**—*Indian Med. Gaz.* 1920. July. Vol. 55. No. 7. pp. 259–260.

Hydatid cysts are not frequently seen in the region of Hyderabad. The author relates the clinical history of two cases.

In the first case, a male Mahomedan aged 25, in whom there were two moveable lumps in the lower right and left abdomen, the history extended over a period of two years. There was constipation and difficulty in micturition. After laparotomy a cyst as large as a swan's egg, pedunculated and attached to a margin of omentum, was excised from the right iliac fossa. Two similar pedunculated cysts were removed, one from below the under surface of the liver, the other below the ascending colon. Two other cysts were found in the omentum and one, the size of a cocoanut, was wedged between the bladder and pelvic colon and firmly adherent to these structures.

In the second case, a female Hindu aged 23, there was a history of swelling of the abdomen for one year. At first pregnancy was suspected but during the latter six months the abdomen became enormously distended the skin shiny, smooth, and the veins dilated and visible; the abdomen was entirely dull on percussion in all positions and in circumference at the

level of the umbilicus measured 46 inches. The patient was very emaciated and there was marked dyspnoea. After laparotomy 2,788 ozs. of slightly opalescent non-albuminous fluid containing numerous daughter and grand-daughter cysts were removed. The solid contents weighed nearly 9 lbs. The hydatid was found to have grown from the under-surface of the right lobe of the liver. The patient made an uneventful recovery in five weeks.

R. T. L.

Fleming (N. B. B.) & Bury (G. W.). **A Case of Primary Hydatid Disease of the Brain with Interesting Eye Symptoms.**—*Lancet.* 1919. Dec. 27. pp. 1186–1189. With 1 text-fig.

Certain remarkable features are reported in a case of primary hydatid of the brain.

The patient was a private in the R.A.M.C. with three years service of which 27 months had been spent in India and two months in Mesopotamia. Patient was fairly intelligent but suffered, on admission, from "considerable loss of memory, particularly for the less common words, names of places, and incidents he particularly desires to relate, and which were apparently clear in his mind a moment previously. He is sleepy, dozes a good deal, and is very startled when aroused; sleep at night is considerably interfered with by headaches. There is nothing suggestive now of staccato speech, his sentences being said quite rapidly till his memory fails and he is compelled to stop." Ophthalmoscopic examination showed "acute optic neuritis in both eyes, with much swelling of the papilla and great fullness of the vessels. Haemorrhages and exudates for about two disc-diameters around the disc." Acuity of vision tested by counting letters and dots appeared to be R.E. 6-12 and L.E. 6-9. He could see but not read J. 1 print quite easily. There was a complete right homonymous hemianopia with macular vision remaining intact. Alexia is definitely present. Agraphia is complicated by muscular weakness; he is quite incapable of writing a word. X-ray report stated that "two or three small opaque bodies are present on right side in frontal lobe about one inch deep, near the middle convolution."

The patient's condition became more serious, general weakness of the right side increasing and deep reflexes became further exaggerated. Right facial paralysis was almost complete. Headache and drowsiness increased. Wassermann test was negative. Lumbar puncture revealed nothing abnormal. The general condition eventually induced the surgeon to operate for cerebral tumour. Immediately after anaesthesia was induced spontaneous respiration ceased. From 11 a.m. to 3.30 p.m. the patient remained without taking a normal breath and without administration or any anaesthetic whatsoever. Death apparently resulted from the further increase in the intracranial pressure due to the anaesthetic which thus paralysed the respiratory centre beyond recovery. Post-mortem showed a typical unilocular hydatid cyst, about the size of a large orange, in the left ventricle. In the middle frontal convolution of the right brain were three calcified nodules one-sixth of an inch in diameter.

R. T. L.

Dévé (F.). **Infantilisme hydatique.**—*C.R. Soc. Biol.* 1920. May 15. Vol. 83. No. 17. pp. 720–721.

Five cases are briefly described in which a state of infantilism is attributed to the long continued action of toxins arising from hydatids of the liver. Removal of the cysts was followed by a general improvement in all cases.

R. T. L.

Yoshida (Sadao). **A New Course for Migrating Ancylostoma and Strongyloides Larvae after Oral Infection.**—*Jl. Parasit.* 1920. Sept. Vol. 7. No. 1. 46–48.

Experiments on guinea pigs show that after oral infection ankylostoma and strongyloides larvae appear in the abdominal and pleural cavities within twenty-four hours and may pierce the liver, pancreas and lungs. Strongyloides larvae smeared on the shaved skin of the abdomen may pierce the abdominal wall and appear in the abdominal cavity or penetrate into the organs of the cavity in about 24 hours. This appearance in the pleural cavity is perhaps due to the passage of the larvae through the œsophageal wall or the larvae may pierce the intestinal wall entering first the abdominal cavity and thence passing through the diaphragm, proceeding to the pleural cavity. Fülleborn believed that the ankylostome larvae found by him in the kidneys and liver of an infected dog reached these situations via the blood vessels. The author believes that the larvae have pierced these organs from the surface by their own power of penetrating the tissues of the host.

R. T. L.

Wrench (G. T.). **Studies in Ankylostomiasis. No. IV.**—*Indian Jl. Med. Res.* 1919. Oct. Vol. 7. No. 2. pp. 475–477.

The following method of searching for ankylostome ova is claimed to be the most efficacious at the present time. "Particles of faeces are scooped up from five different parts of the stool with bazaar made scoops. This faeces is placed in a test tube and shaken up with equal parts of methylated ether and hydrochloric acid (33 per cent.), the emulsion strained through fine muslin and centrifuged. The fat and debris are carried or 'levitated' to the top, the ova with heavier debris are deposited below in a fine emulsion. This emulsion is sucked up by a pipette and as much as possible placed on the upper surface of a coverslip resting on a slide, three coverslips being made by cutting an ordinary slide into three equal parts. Five minutes or more are allowed for settlement. The excess fluid is then pipetted off and the coverslip examined. If the emulsion is too thick for vision it may be diluted and mixed with more of the ether and hydrochloric acid mixture, and, after a further five minutes for settlement, the excess again pipetted off." The author claims that "the method has the great advantage of simplicity, and does not require depressors, springs and dishes, which increase the chances of contamination and need frequent sterilisation."

R. T. L.

Lane (Clayton). **'Studies in Ankylostomiasis': A Criticism.**—*Indian Jl. Med. Res.* 1919. July. Vol. 7. No. 1. pp. 223–228.

Captain Wrench's view that organized campaigns for treatment of hookworm on an extensive scale cannot attain their object is discussed by the writer, who holds that the lay administrator is morally compelled to attempt to obtain without delay for the many benefits which have already been obtained for the few. The correctness of several assumptions by Captain Wrench is questioned. There is

strong presumptive evidence that reinfection was taking place during the course of his observations. The methods used for diagnosis were inadequate in accuracy and rapidity, for the variations in his daily findings in the stool from the same case should not be so large. The poor results of treatment with oil of chenopodium obtained by Wrench (22 per cent.) are contrasted with those obtained by Darling, Barber and Hacker (99·4 per cent.).

R. T. L.

Lane (Clayton). **The Technique of the Levitation Method.**—*Indian Jl. Med. Res.* 1919. July. Vol. 7. No. 1. pp. 229–234.

The technique for the detection of hookworm ova in the stool published by the author in 1918 [see this *Bulletin*, Vol. 12. p. 183] is stated to be inadequately described for anyone who had not seen the method in actual use. The difficulties of adequately condensing a technique are pointed out and a very detailed account of each step is now given. The original figures are reproduced. [The paper should be consulted by all interested in hookworm treatment for the method gives on an average a tenfold concentration of hookworm eggs under conditions of full visibility with great gain in rapidity and accuracy of diagnosis.]

R. T. L.

Mhaskar (K. S.). **The Prevalence of Ankylostomiasis in the Madras Presidency.**—*Indian Jl. Med. Res.* 1919. Oct. Vol. 7. No. 2. pp. 412–428. With 1 chart.

The conclusions stated in this paper confirm the results of the inquiry carried out among Tamil coolies collected from the southern half of the Madras Presidency at the Negapatam Emigration Depot, viz., that hookworm infection is universal but varies in intensity in the various districts and communities. In the four districts of Tanjore, Trichinopoly, Madura and Ramnad the hookworm infection reaches almost 100 per cent. *Necator americanus* occurs in nearly 100 per cent., while *Ancylostoma duodenale* varies from 80 per cent. in Tanjore to 10 per cent. in Madura districts. It is noted that "hookworm infection seems to diminish the susceptibility to bowel complaints."

R. T. L.

Ascanio-Rodriguez (J. B.). [**Hookworm Disease in Venezuela.**]—*Rev. de Med. y Ciruj. Caracas.* 1919. Apr. Vol. 2. No. 13. p 282. [As summarised in *Jl. Amer. Med. Assoc.* 1919. Aug. 9. p. 460.]

A list of the places in Venezuela is given where hookworm was acquired by the author's patients, showing that practically the whole country is infested.

R. T. L.

Adams (Roy D.). **Hookworm and Manifest Tuberculosis.**—*Southern Med. Jl.* 1920. Feb. Vol. 13. No. 2. pp. 105–109.

Available sources of information indicate that "manifest tuberculosis" is more frequent among individuals harbouring hookworm than among the hookworm free, living under similar conditions. A generally lowered resistance, incidental to hookworm disease, especially evident as anaemia and malnutrition, is credited with being the essential factor producing lapse of immunity to tuberculosis. There is no evidence establishing any specific relationship between ankylostomiasis and tuberculosis.

R. T. L.

Usami (K.). **Complement Fixation Test of Serum in Uncinariasis.**—*Japan Med. World.* 1919. Oct. 5. No. 303. [As summarised in *Jl. Amer. Med. Assoc.* 1919. Nov. 15. p. 1556.]

Using an alcoholic extract of the hookworm as antigen Usami got positive results in almost all cases of uncinariasis. The same antigen produced positive results in a patient infected with ascaris, thus proving that test is by no means specific.

R. T. L.

Langeron (Maurice). **Importance des Papilles cervicales des Ankylostomes.**—*Bull. Soc. Path. Exot.* 1920. July 7. Vol. 13. No. 7. pp. 539–545.

The author gives a historical review of the important papers dealing with the anatomy of the ankylostomes from 1843 onwards. Although the older workers, e.g., Dubini, Bilharz, and Diesing, mention the presence of cervical papillae in the ankylostomes many later writers do not refer to them. Lists are given of the different genera of Trichostrongylinae, Strongylinae and Spiruridae in which cervical papillae are present and great stress is laid on the importance of their presence or absence from the systematic point of view.

Necator argentinus Parodi 1920 is considered to be synonymous with *Necator americanus.*

R. T. L.

Lane (Clayton). *Ancylostoma duodenale* **as a Parasite of** *Felis tigris.*—*Indian Jl. Med. Res.* 1917. July. Vol. 5. No. 1. pp. 210–216. With 1 plate. [Received Feb. 1920.]

The consensus of opinion is that *Ancylostoma duodenale* is, apart from experimental infection, a parasite of man and of man only, save that Brumpt states that it is also found in anthropoid apes. The author records details of the finding of living specimens of this species of hookworm in a tiger shot near Sevoke at the foot of the hills in the Darjeeling district. Either these parasites were true parasites or were fortuitously present as part of its food. In the latter case the tiger must quite recently have killed and eaten a man.

R. T. L.

Caius (J. F.) & Mhaskar (K. S.). **The Correlation between the Chemical Composition of Anthelmintics and their Therapeutic Values in Connection with the Hookworm Inquiry in the Madras Presidency. (i) Thymol. (ii) Oleum Chenopodii. (iii) Oleum Absinthii. (iv) Oleum Tanaceti.**—*Indian Jl. Med. Res.* 1919. Oct. Vol. 7. No. 2. pp. 429–463 & 1920. Jan. Vol. 7. No. 3. pp. 570–609.

In this and succeeding papers the authors record their studies designed to determine (1) the chemical nature of the anthelminthic; (2) its toxicity towards the host; rate and amount of absorption if any; its neutralisation in the system; its elimination by the kidneys and in the faeces; (3) its action on the hookworm whether vermicidal or vermifugal or both. The present communication deals with Thymol, which they say is "a solid drug of constant chemical composition not deteriorating with age, and easily obtained in the pure state. Its dosage is thus easy and certain." Bozzolo (1879) first successfully used Thymol on a case on ankylostomiasis which had proved refractory to the extract of the male fern. Thymol is one of the two theoretically possible hydroxyl derivatives of para-cymene. It is nearly related to many of the terpenes or hydrocarbons of the turpentine class and their oxygenated derivatives, the camphors. Thymol may be looked upon as one of the higher homologues of benzene, phenol or metacresol and its physiological properties are, as a matter of fact, but variations of the properties exhibited by these three substances.

A series of experimental results is expressed in tabular form to show the absorption and elimination of Thymol. It is clear that the amount of Thymol eliminated depends on the quantity administered, not on the mode of administration. From 20 per cent. to 43 per cent. of the Thymol administered per os to healthy adults was recovered from the urine, and none from the faeces even with an after purge of magnesium sulphate. All recoverable thymol was eliminated within the first 24 hours and the after-purge was found to have no appreciable effect on the amount excreted. *The necessity of the after purge becomes therefore, questionable.* This rapid absorption may be the reason why Sandwith and others have given alcohol during treatment without untoward effects. There is practically no effect on the urine, the density and volume remaining normal. The efficiency of Thymol gradually increases with a dose from 10 to 60 grains. For the same dosage, one-dose treatment is more efficient than the 2 or 3 dose treatment; 30 grains of Thymol given in one portion is as effective as 50 grains in three portions. A 60 grain dose given in one portion may be taken as the maximum vermicidal dosage. Whatever the mode of administration or the dosage *Ancylostoma duodenale* is more resistant to Thymol than *Necator americanus*. Thymol is equally powerful as an ascaricide. It has also a vermifugal action, as in the absence of a purgative the number and nature of the motions obtained with a dose of 50 grains show that the drug is able itself to stimulate the intestine and promote evacuation. A pre-purge does not appreciably increase the efficiency of treatment. No restriction need be put on the nature and quantity of food either before or after treatment. The authors maintain that their work shows that hookworm treatment may be effectively reduced to the simple ingestion of the drug in proper dosage.

The elimination of the purges and absence of medical supervision helps materially to reduce the cost.

The oils Oleum chenopodii, Oleum absinthii and Oleum tanaceti are dealt with in three successive papers with the same general title. "American wormseed oil, or Ol. chenopodii, has long been a household remedy for worms, especially for ascarids in the United States. The first death was in 1851 in a child six years of age. Further fatal cases are recorded in 1875, 1878 and 1880. BAUMLER of Fribourg having heard of its usage as an anthelmintic in Brazil first introduced it into Europe in 1881 and treated a case of ankylostomiasis without success. CALMETTE and BRETON in 1905 found it inefficient in ankylostomiasis. BRUNING began to use it successfully in 1909 and SCHÜFFNER and VERVOORT in 1913 published results obtained in Sumatra showing its superiority over thymol, betanaphthol and eucalyptus oil [see this *Bulletin*, Vol. 2. p. 185]. The later history is also detailed in the paper.

The oil is distilled from *Chenopodium ambrosioides* var. *anthelmintica*. Two of the seven species that occur in India are credited with anthelmintic action, viz. *C. ambrosioides* and *C. botrys*. Oil of chenopodium is a mixture of constituents. It has no distinct boiling point and explodes with extreme violence when heated to about 100°C. In addition to "ascaridol" which was obtained by fractionating at reduced pressure, the oil contains para-cymene and two new terpenes, phallandrene and terpinene. The anthelmintic activity of the oil disappears on complete reduction with Ferrous sulphate thus verifying the conclusion that the medicinal properties are due to ascaridol. The percentage of ascaridol varies in different samples from 45 to 65 per cent. The constituents of chenopodium oil are partly absorbed and eliminated through the kidneys, generally during the first twenty four hours after treatment and never beyond forty eight hours. No chenopodium could be recovered from the faeces. The after-purge was omitted in 117 cases and no signs of toxaemia resulted. The oil has no vermifugal action and the dead hookworms were mostly evacuated on the day following treatment. Full diet abates the toxic symptoms without lowering the efficiency of chenopodium oil.

The want of uniformity in the composition of chenopodium oil is responsible for the conflicting opinions as to its value in hookworm infection. 48 minims seems to be the maximum dose ever used. At present in Ceylon the maximum dose recommended is 24–28 minims. Castor oil not only fails to diminish toxicity but also tends to intensify the symptoms of giddiness. Liquid petrolatum greatly impaired the effect of chenopodium. The suppression of an initial purge renders the treatment far less exhausting. The optimum dose is different for every sample and so far there is no simple and accurate method of determining it. The toxic and vermicidal properties reside in the same active principle.

(b) *Oleum absinthii*, or "oil of wormwood," was tested and it was found of no potency as an anthelminthic for ascarids, whipworm or hookworm.

(c) *Oleum tanaceti*, or oil of tansy, is toxic in doses of 35 minims. Some persons are sensitive to smaller doses. The drug is ineffective for the removal of hookworms, ascarids or whipworms.

R. T. L.

Lal (Hira). **Observations on the Treatment of Hookworm Disease.**—*Indian Med. Gaz.* 1920. Aug. Vol. 55. No. 8. p. 289.

Examination of the stools of 759 workers at the Bhowra colliery showed 451 to be suffering from hookworm disease. Of these 109 presented themselves voluntarily for treatment. The treatment given was two doses of 30 grs. thymol with an equal quantity of sugar of milk, the interval between administration being two hours. This treatment was preceded and followed by a purge consisting of magnesium sulphate. The following points were observed :—

(1). Excessive drinking of water during the treatment caused vomiting.

(2). Free ventilation formed an important part in reducing the toxic symptoms.

(3). Curry and rice caused vomiting whereas a diet of bread, curry and tea without milk and rice had no ill effects.

(4). Eight of the cases before treatment suffered from night blindness ; after treatment this disappeared in two or three days.

The question arises, Does hookworm disease cause night blindness or is thymol a specific cure for this disease ?

R. T. L.

Darling (S. T.). **Suggestions for the Mass Treatment of Hookworm Infection.**—*Lancet.* 1920. July 10. pp. 69–72. With 1 text-fig.

The work of the Malaya Board in the Far East discloses the fact that practically 100 per cent. of the agriculturists are infected with hookworm. There is a positive relationship between the actual number of worms harboured and the amount of blood loss or anaemia suffered, but a given number of worms produces a greater degree of anaemia in children than in women and similarly in women than in in men. *A. duodenale* is more potent than *Necator americanus*, owing probably to the more severe haemorrhage caused by the bites of the former worm. It is extremely important that emphasis be placed on the constant blood loss from multiple small worm-bites. The diagnosis based on the administration of a vermifuge is much more rigorous than that obtained by microscopical technique. The percentage of infections detected by the former method is 100 as compared with 75 per cent. by the latter. Chenopodium is the most efficacious vermifuge and retains the efficacy better than thymol with a reduction of the dose. A dose of 1·5 cc. of oil of chenopodium was highly efficient and but slightly toxic, sometimes causing transient dizziness and vomiting. Two treatments of this dosage removed 99 per cent. of the hookworms. Omission of the preliminary purgative did not materially alter the efficiency of the drug. Castor oil should not be given as it increases the toxicity of chenopodium. Magnesium sulphate in ½ to 1 oz. dose acts very well.

In tropical communities the incidence of hookworm is so high that microscopical diagnosis should be dispensed with. Heavily infected communities should be treated first. Chenopodium is five times less costly than thymol for the equivalent result in worm eradication. Important as is the education of the people and the installation of latrines the ridding of the people of an enormous amount of curable debility and economic inefficiency is of greater immediate importance.

R. T. L.

Schapiro (Louis). **The Physical and Economic Benefits of Treatment for Hookworm Disease.**—*Jl. Amer. Med. Assoc.* 1919. Nov. 15. Vol. 73. No. 20. pp. 1507–1509.

Lately an opportunity has been afforded the author to make a detailed analysis of the earning capacities, before and after treatment, of 320 patients cured of hookworm disease on the estates of Rodeo in Mora (a canton of San Jose) and of Aquiares in Turrialba (a canton of Cartago). These are two representative estates in Costa Rica situated the one on the Atlantic the other on the Pacific slope of the country in the midst of rich agricultural regions. The following conclusions were noteworthy :—

(a) " There is a permanent increase in haemoglobin as a result of treatment for hookworm disease.

(b) " On one farm, in spite of a 15 per cent. reduction in unit pay, the labourers earn 27 per cent. more. On another, where there has been no reduction in unit pay, they earn 14·6 per cent. more.

(c) " The owners of one farm are cultivating 33 per cent. more coffee with the same number of labourers, at a lower unit cost.

". . . One estate reports a marked reduction in morbidity and in infant mortality, and both estates report that the labourers spend less than formerly, or else spend nothing at all, for quack medicines and quack physicians to cure their infirmities."

R. T. L.

Smillie (Wilson G.). **Betanaphthol Poisoning in the Treatment of Hookworm Disease.**—*Jl. Amer. Med. Assoc.* 1920. May 29. Vol. 74. No. 22. pp. 1503–1506. With 2 charts in text.

Boyma and Alves have advocated the use of larger doses of Betanaphthol. In hospital, patients were given a preliminary saline purge, followed next day by 6 gm. in 1 gm. doses at 15 minutes interval. A final saline purge was given two hours after the last capsule of Betanaphthol. 85 per cent. of cures were reported and no evil results. Gonzaga and Lima in São Paulo slightly adjusted this treatment to render it more appropriate for field work on a large scale. The preliminary purge was omitted and 6 gm. Betanaphthol in one dose was given early in the morning and a similar dose was repeated on three successive days. Throughout treatment the patient receives only a light diet. Two hours after the last dose a saline purge was administered. Of 400 heavily infected cases treated by this method 73·5 per cent. were cured and no severe toxic symptoms were recorded. The author conducted four series of experiments on 79 cases in all. The conclusion was that this 18 gm. of Betanaphthol in doses of 6 gm. on 3 successive mornings was only slightly toxic in most cases.

In two cases however very severe toxic symptoms followed and in two other cases there were marked changes in the blood. The drug destroyed the red blood cells in great numbers with severe anaemia, icterus, and enlargement of the spleen, liver and gall-bladder. There was haemoglobinuria. The changes in the organs were consequent upon the destruction of the red cells. In all three cases of severe poisoning there was a recent history of malaria. The author considers it inadvisable to give 18 gm. dose of Betanaphthol for routine treatment of hookworm infection.

R. T. L.

YOSHIDA (Sadao). **On the Development of *Ascaris lumbricoides* L.**— *Verhandl. der Japan. Path. Gesellsch. Tokyo.* 1918. Apr. 2–4. Vol. 8. pp. 160–162.

The conclusions arrived at by the author as a result of experiments on the development of *Ascaris lumbricoides* continued since 1916 confirm in many essentials those published by STEWART in 1918.

1. Human ascaris may develop without any intermediate host during its life cycle.

2. Unfertilised eggs and eggs without albuminous coating cannot develop.

3. Uninjured fertilised eggs develop most rapidly in moderate moisture between 28° to 34°C. In favourable environment embryos appear within the eggshell after about a fortnight.

4. Unripe ova cannot develop into embryos after ingestion.

5. The ripe, embryo-containing, eggs hatch out and the embryos escape into the intestine about fifteen hours after ingestion.

6. The escaped embryos migrate from the intestine to the liver, lungs and trachea and pass through the mouth cavity, oesophagus, stomach and eventually reach the intestine, where they stay for some time but are sooner or later evacuated in the faeces.

7. The larvae stay for some time and grow rapidly in the lungs.

8. The liver shows injury and haemorrhage only on microscopical examination.

9. In the lungs are notable haemorrhages and frequently pneumonic reactions, the severity of which agrees exactly with the intensity and duration of the time of infection.

10. The author swallowed larvae from the lungs of a guinea-pig without result. Later he swallowed 50 larvae of larger size (1·65 mm.) taken from the trachea of a guinea-pig and evidence of infection showed after 75 days, eggs being then found in the faeces.

11. The migration in the human body is essentially the same as in the experimentally infected rat, mouse, monkey and rabbit.

12. The embryos pierce the intestinal wall, then pass from the abdominal cavity through the diaphragm, finally penetrating the lungs from their surfaces.

13. It is doubtful if an animal once infected acquires immunity.

14. Embryos newly hatched measure 0·2 mm., those fully developed in the lungs 1·5 to 2 mm.

15. Ascaris eggs easily develop into embryos in 0·7 per cent. HCl, 0·3 per cent. carbolic acid, 0·7 per cent. corrosive sublimate solution, 4 per cent. acetic acid, 5 per cent. formalin, 7·5 per cent. solution of common salt, 0·3 per cent. nitric acid, 1 per cent. solution of sodium hydrate, 5 per cent. solution of calcium chlorate.

16. Strong sunlight may retard or check the development of the eggs.

17. The author considers that it is phylogenetically important for ascarid larvae to pass through the lungs of the host to complete their larval development.

18. The author similarly inclines to the view that larvae of all nematode species have to pass through the lungs, e.g., Oxyuris and Trichocephalus groups.

R. T. L.

Yoshida (Sadao). **On the Resistance of Ascaris Eggs.**—*Jl. Parasit.* 1920. Mar. Vol. 6. No. 3. pp. 132–139.

Ascarid eggs are unable to develop in human urine and ultimately die. The urine apparently acts more effectively at the higher temperature of 31° C. than at a lower one of 10° C. The urine appears to contain ferments which dissolve the egg covering. The influence of reagents depends upon the permeability of this covering. Formalin and sulphuric acid coagulate the albumin-coating of the ascarid eggs and so prevent penetration. After long action glacial acetic acid, hydrochloric acid and nitric acid destroy or break down the albuminous covering but do not penetrate easily through the inner chitinous shell. Of other reagents, carbolic acid penetrated the most easily and effectively. Mature eggs put on the ground out of doors for the winter months were infective to guinea-pigs, showing that cold did not destroy the embryos.

R. T. L.

Rost. **Ascaris Ileus.**—*Deutsche Zeitschrift für Chirurgie. Leipzig.* 1919. Sept. Vol. 151. Nos. 3–4. p. 251. [Summarised in *Jl. Amer. Med. Assoc.* 1920. Aug. 28. Vol. 75. No. 9. p. 642.]

Experiments on animals showed that total extracts of ascarids exaggerated the tonus of the bowel, while an extract of the skin of these worms had the opposite effect.

This throws light on the spastic conditions found in cases of Ascaris infection where violent abdominal pain is a feature. The tonus-reducing property of the ascaris skin may be responsible for certain functional disturbances in ascariasis, possibly causing clumping of the worms.

R. T. L.

Thau (E. S.). **The Pathogenicity of *Ascaris lumbricoides* with Report of Cases.**—*Nat. Med. Jl. China.* 1920. Mar. Vol. 6. No. 1. pp. 21–27. With 1 text-fig.

In China *Ascaris lumbricoides* is a very common intestinal parasite. The author lays stress on the importance of treating cases as soon as the ova are detected in the faeces. Cases are cited from all over the world in which death was due to migrations and abnormal behaviour of ascarids.

Two such cases are described in detail: in one ascarids had penetrated the intestinal wall; in the other death was due to blocking of the cystic duct by 9 adult worms.

R. T. L.

Adeodato (J.). **Uma trompa cystica contendo uma ascaride.** [A Cyst of the Fallopian Tube containing an Ascaris.]—*Brazil Medico.* 1919. Oct. 4. Vol. 33. No. 40. pp. 315–316.

An account of a case in which the author removed the uterus and annexa from a patient suffering from bilateral cystic salpingo-oophoritis. Adhesions were numerous and dense and their resistance rendered unavoidable the rupture of the cystic tubes from which an odourless turbid fluid

escaped. There was then found, at the bottom of Douglas's pouch, a dead ascaris. Some time before the operation the patient had suffered from a copious purulent discharge from the rectum. This, however, had ceased for a considerable period before the operation. A careful examination failed to show the least trace of the aperture by which the parasite had made its way from the bowel into the tube and the special feature of interest in the case is the fact that the complete closure and cicatrisation of the aperture had not been prevented by the presence of the ascaris in the tube and, further, that the parasite had remained unputrefied in the inflammatory fluid in the cyst.

F. S. Arnold.

Low (George C.) & Manson-Bahr (Philip). *Filaria bancrofti* **in the Production of Elephantiasis and Kindred Diseases.**—*Brit. Med. Jl.* 1920. Aug. 14. pp. 233–234.

The views of the authors are classed under three headings :— (a) " Zoological." The filaria worms live in the lymphatic vessels or in the glands. They probably secrete irritating toxins or by mechanical irritation cause a local inflammation of the vessel wall or of the gland. The embryos are non-pathogenic. After-history usually shows that perfect health is not compatible with filarial infection. The authors state that " it is questionable if any helminth, especially those inhabiting the arterial or lymphatic vessels, is harmless." (b) " Pathological." During the lifetime of the parasite a narrowing of the lumen of the containing vessel occurs and there is a proliferation of the endothelium. These processes result in chronic stasis and ultimate obliteration of the lumen. Embryos though non-pathogenic are later destroyed, their disintegration resulting in inflammation and consequent fibrosis of lymphatic tissues. Calcification of adult worms results in chronic irritation. With the death of the parasite the effects on the tissues acquire permanency. These eventuate in the highest expression of lymph stasis, viz., elephantiasis. (c) " Statistical." The maximum prevalence of elephantiasis, chyluria, lymph scrotum, hydrocele, etc., corresponds almost exactly with the geographical distribution of *Filaria bancrofti*. The presence of embryos in the blood is by itself a fallacious index.

In the discussion on the paper Surgeon Rear-Admiral Bassett-Smith drew attention to the marked eosinophilia as an indication of the toxicity of the parasite, and to the resistance to treatment with intravenous injections of arsenic and antimony over a period of years.

R. T. L.

Stephens (J. W. W.) & Yorke (Warrington). **Problems of Filariasis.** —*Brit. Med. Jl.* 1920. Aug. 14. pp. 231–232.

In the literature of filariasis are many conflicting statements. The authors contrast the " microfilaria rate " at different age-periods given in the papers by Bahr for Fiji and Cruickshank and Wright for Cochin-India. In Bahr's figures the rate for males increases up to 31–40 and then remains stationary while in Cruickshank and Wright's figures the rate for males is practically the same at all periods. A similar discrepancy is found in the figures given by Manson for Amoy and Bahr for Fiji as the microfilaria rate among

those showing signs of lymphatic disease and those not showing signs. Again the evidence, by various authors, of the relation of the microfilaria rate to the elephantiasis rate is contradictory. Further, the authors fail to find any definite relationship between the microfilaria rate and the elephantiasis and abscess rates in different countries. Finally the region of the body most commonly affected with elephantiasis appears to vary in different countries; e.g., Fiji has 42·6 per cent. of elephantiasis of the arm, in French Congo elephantiasis of the arm is apparently unknown. These discrepancies illustrate a few of the many problems surrounding filarial disease.

R. T. L.

Rousseau (L.). **Filariose au Cameroun.**—*Bull. Soc. Path. Exot.* 1919. Jan. 8. Vol. 12. pp. 35–51. With 2 charts.

In the region of Douala 48 specimens of blood from natives out of 132 examined were found to contain microfilariae. The incidence of the embryos in the blood increased with the age of the patient: 81 per cent. of those infected were adults. Both *Microfilaria loa* and *Microfilaria perstans* were seen, the latter rather more frequently than the former. The dimensions, form, movement, internal structure and periodicity of both parasites are discussed in detail. During 2 years the author found 11 adult *Loa loa* post mortem but never saw an adult *Filaria perstans*. In all cases there was a leucocytosis characterised by a large proportion of polymorphonuclear eosinophile cells. Elephantiasis was not common; the blood of 6 cases of this disease was examined both by day and night but only *Microfilaria perstans* was found.

Six cases of *Onchocerca volvulus* are recorded and a detailed description of the embryo is given. The embryos were obtained by puncture of their tumours; none were found in the blood.

R. T. L.

Leger (Marcel). **Remarques hématologiques et cliniques sur la Filariose de Bancroft à la Guyane française.**—*Bull. Soc. Path. Exot.* 1920. Apr. 14. Vol. 13. No. 4. pp. 248–252.

In French Guiana filariasis is widespread. The author draws attention in this note especially to three points of interest.

(a) The frequency of filarial infection in children:—Out of 55 examined at night, ten were less than 5 years old and of these one was found infected. Of 17 between the ages of 5 and 10 years two were infected and of 28 between the ages of 10 and 15 years six were infected. The youngest case of infection was four years old. The statement that filariasis is exceptional in infancy is correct only as applied to those under five years of age.

(b) Filarial haematochyluria is commonly observed in French Guiana. Within three years the author saw 25 cases in which *Filaria nocturna* embryos were present in the urine.

(c) There is, in the author's opinion, a pernicious filariasis as there is a pernicious ankylostomiasis. He gives clinical records of two fatal cases in which unfortunately autopsies were refused.

R. T. L.

Engeland (Otto). **Beobachtungen ueber den Turnus und das prozentuale Vorkommen der *Microfilaria bancrofti* in Deutsch-Ostafrika.** [Report on the Periodicity and Percentage Findings of *Mf. bancrofti* in German East Africa.] *Arch. f. Schiffs- und Trop.-Hyg.* 1920. Apr. Vol. 24. No. 2. pp. 51–53.

Further information was sought concerning the nocturnal periodicity of sheathed microfilariae in the blood of natives of East Africa. Of 297 "Askaris" [native soldiers] 96, i.e., 32·32 per cent. had *Microfilaria bancrofti* in the blood at night and in only 6, i.e., 2·06 per cent., did these appear also in the day-blood. There is therefore a well marked nocturnal periodicity in East Africa. Of 20,248 blood films made in Dar-es-Salaam during 1908 to 1909 539 contained microfilariae, i.e., about 2·7 per cent. During 1909 to 1910, of 19,604 blood films 325 were positive (i.e., 1·9 per cent.). At Tanga 13,704 preparations gave 303 positives for microfilaria (i.e., 2·2. per cent.). These films were taken for malarial diagnosis and contrast in results with the occurrence of microfilariae in the day-blood. *Filaria perstans* is apparently uncommon, as embryos were found in 7 persons out of the total 297 examined by the author.

R. T. L.

Martinez Alvarez (A.). [Translated by Ambrose (Lodilla).] **Clinico-Microscopical Observations on Filariasis.**—*New Orleans Med. & Surg. Jl.* 1920. June. Vol. 72. No. 12. pp. 701–706.

Fifty cases were studied in the district of Puerta de Tierra in Puerto Rico. These were obtained from four large well-defined foci. There are also three or four small foci of endemic filariasis. The various obscure clinical forms seen by the author are classified :——

(1) Comatose form in children ; (2) Epileptoid form ; (3) Pseudotyphoid form ; (4) Premature childbirth and abortion as premonitory symptoms or symptoms subsequent to the attack of acute filariasis; (5) Certain class of abscesses.

During the acute attack there exists a polymorphonucleocytosis attaining at times to 30,000. After the attack there is a periodical nocturnal eosino-lymphocytosis. The changes of the moon between the fourth quarter and the new moon mark in many cases a monthly eosino-lymphocytosis.

R. T. L.

Jeanselme (E.), Schulmann (E.) & Pomaret (M.). **Note sur les urines au cours de la chylurie filarienne.**—*C. R. Soc. Biol* 1920. Mar. 20. Vol. 83. No. 11. pp. 353–354.

In three cases of filarial chyluria the authors found that the chemical constituents of the urine were very variable: fats, cholesterin, albumin, glycoproteids and phosphoproteids all being present.

It was noticed that the amount of these different constituents varied according to the position of the patients. Sometimes the position of rest led to temporary elimination of all of them.

R. T. L.

Kondo (K.) & Hara (Y.). **[A Case of Filarial Chyluria of Aborigines of Formosa.]**—*Taiwan Igakkai Zasshi* (*Jl. of the Formosa Med. Soc.*) 1919. June. 28. No. 200. pp. 688–9.

Although Formosa is situated near Loo-Choo and the east coast of China, where filarial chyluria is very common, it is curious to find that this disease is here extremely rare, especially among the aborigines. The case recorded is of a woman, 44 years old, who had never been out of her native island, Hôko Tô (Pescadores), with no noticeable anamnesis. Young filariae were found in both urine and blood. In agreement with *Filaria bancrofti*, the appearance of the young in peripheral blood vessels takes place only during night, beginning at 7 p.m., and attains the maximum at midnight. Neither artificial darkness in daytime nor awakening and exercise during night caused any change on this regular periodical phenomenon. The young found in the urine show no such change between day and night. There are some changes in the blood, especially an increase of eosinophile cells. Injection of hydrochloric acid, emetin or imamycol shows no effect. Treatment with potassium iodide, urotropin, etc., to increase the amount of urine only reduced the pain at the time of micturition.

Hiroshi Ohshima.

Bana (F. F.). **An Acute Attack of Asthmatic Dyspnoea caused by Filarial Embryos.** [Memorandum.]—*Brit. Med. Jl.* 1920. June 12. p. 796.

A case is briefly reported of a man aged 50 who when seen had been unable to sleep and had breathed with great difficulty since the previous night. He was unable either to lie down or sit up, and maintained a semi-recumbent position; his face and lips were blue, respirations were 28, pulse 100, temperature 99°F. Sibilant and sonorous rhonchi and large and small râles were heard all over the chest. There was no history of a previous attack. The diagnosis made was an acute attack of asthma brought on by exposure the previous night. In a blood smear, made in the afternoon, there were two filarial embryos and an eosinophile count of 4 per cent. The author states, "It was now clear that the asthma was due to the irritation caused by the filarial embryos in the pulmonary capillaries" and regards this as a satisfactory explanation of the failure of adrenalin, potassium iodide, belladonna and morphine to give immediate relief.

R. T. L.

Macfie (J. W. S.). **Three Cases of Filariasis in which Intravenous Injections of Tartar Emetic were given**—*Jl. Trop. Med. & Hyg.*, 1920. Feb. 2. Vol. 23. No. 3. pp. 36–38. With 1 chart in text.

From a study of three cases, one each of *F. bancrofti*, *F. perstans*, and *F. loa* the author concludes that in the small doses used tartar emetic appeared to have no effect on the number of embryos in the blood and that if it had any action on the parent worms the effect was not appreciable within a post-treatment observation period of three or four months. The total amount of tartar emetic given was $5\frac{1}{2}$ grains in a case of *Mf. perstans*, 6 grains in a case of *Mf. bancrofti*, and $1\frac{1}{4}$ grains in a mixed case of *Mf. loa* and *Mf. perstans*.

R. T. L.

Rogers (Leonard). **Further Work on Antimony Intravenously in Filariasis.**—*Brit. Med. Jl.* 1920. May 1. pp. 596–598. With 1 diagram in text.

In 1919 the author published a preliminary report on a short trial of sodium antimonyl tartrate solution injected intravenously in filariasis and showed that the drug apparently had some action in reducing the number of filariae in the peripheral blood in the evening. The results now recorded form a series of eight cases studied over a longer period.

During the first six days the doses given were respectively 3, 4, 4½, 5, 5, 5 cc. of a 2 per cent. solution after which, as toxic symptoms appeared, 5 cc. were given every other day as far as possible up to six weeks from the commencement of the treatment. In four cases the very great reduction in the number of filaria embryos indicated successful treatment. In the four unsuccessful cases there was a rapid return to the original number of embryos indicating that the drug had failed to kill the adult worms. The total amount of the drug given and the number of doses were practically identical.

A set of five controls were studied and it is noted that the variations in one of them ranges from 45 per cent. to 160 per cent. These variations were rapid and without any very regular periodicity. In daily counts at the same hour there were also great fluctuations. The paper concludes with clinical notes of three recent cases treated by the author: (a) early elephantiasis, (b) filarial orchitis, (c) chyluria. Clinically favourable results have been obtained in a few cases but the author admits that a rather long course of intravenous injections is required to produce an effect. Dr. P. N. Das has communicated that 5 to 6 injections in up to 5 cc. doses of the colloid preparation failed to reduce the filarial embryos.

R. T. L.

Low (George C.) & Gregg (A. L.). **The Uselessness of Antimony in the Treatment of Filariasis.**—*Lancet.* 1920. Sept. 11. pp. 551–552.

A case of filariasis (*F. bancrofti* infection) was treated by intravenous injections of antimony tartrate. A table shows the results of the injections on the filarial counts. Injections were given over a period of 19 days during which time 17½ grs. of tartar emetic were administered. The injections had no effect on the adult worms as the supply of embryos in the blood was in no way diminished except on the night immediately after the injections; those present were alive and healthy and their numbers soon returned to normal.

In these filarial counts a measured amount (20 cmm.) of blood was always taken. Dried films and wet cover-glass preparations were both employed, the former for the count, the latter for the determination of the death of the embryos.

R. T. L.

Ikegami (Y.). [**Treatment of Filariasis with Arsaminol.**]—*Taiwan Igakkai Zasshi* (*Jl. of the Formosa Med. Soc.*). 1920. Mar. 28. No. 209. pp. 377–9.

The author, who has been doubtful of the value of salvarsan as a cure of chyluria from his own experiences, describes a remarkably

successful case. A Chinese boatman, 22 years of age, had been suffering from chyluria for about one year. Besides the administration of potassium iodide and urotropin, the injection of 0·3 gm. of Arsaminol Japanese salvarsan) dissolved in 150 cc. of 0·5 per cent. sterile salt water was made twice. The young filariae disappeared and the urine cleared after the second injection, and for more than one year since then no reappearance of the symptoms has taken place.

H. Ohshima.

Roubaud (E.) & Jamot (E.). **Présence d'*Onchocerca volvulus* dans un abcès suspubien. Quelques précisions morphologiques sur le parasite.**—*Bull. Soc. Path. Exot.* 1920. Apr. 14. Vol. 13. No. 4. pp. 252–254.

A large and tense sub-pubic tumour, in a native of Bengué-Bon Kingué, was first diagnosed as due to retention of urine. This diagnosis was abandoned and the tumour punctured with a needle, clear pus issuing from the swelling. A big incision was then made and a large cavity was opened up. This contained slightly foetid pus in which a mass of filarial worms was found. These proved to belong to the species *Onchocerca volvulus*. Similar cases of abscess formation due to *O. volvulus* have been recorded by Rodenwaldt (1912) Bach (1913) and Fülleborn (1913).

A succinct account of the morphology of the parasite concludes the paper. The male specimens measured from 28 to 40 mm. The caudal papillae are somewhat variable; sometimes 3 pairs, more often 4 pairs of paranals were noted. In addition there were 2 pairs of precaudal papillae. The large spicule measured 200–220μ, the small one 70 to 80μ. The complete female worms measured 23 to 48 cm. The largest specimens attained to 50 cm. The ventral aspect of the tail is groved, giving to this worm the mitred appearance characteristic of *Filaria perstans*.

R. T. L.

Fischer (W.). **Zur Kenntnis der Parasiten der Konjunktiva.**—*Zentralbl. f. allg. Pathol. u. pathol. Anat.* 1919. June 1. Vol. 30. No. 10. p. 226. [Summarised in *Arch. f. Schiffs- u. Trop.-Hyg.* 1920. Feb. Vol. 24. No. 1. p. 26.]

The worms found by Assmy in the eyes of a Chinese dog are described in detail by the author to enable a comparison to be made with *Thelazia callipaeda*. The forms are identical with those found in man and recorded by Stuckey and Houghton in 1917. [See this *Bulletin*, Vol. 10. p. 121.]

R. T. L.

i. Montpellier (J.) & Ardoin (E.). **La cure arsénobenzolée dans la dracunculose.**—*Bull. Soc. Path. Exot.* 1919. Dec. Vol. 12. No. 10. pp. 730–732.

ii. Balfour (Andrew). **Treatment of Guinea-Worm.** [Correspondence.]—*Lancet.* 1920. Apr. 17. p. 885.

i. Four cases of guinea-worm were treated by arsenobenzol injections in Algeria and the authors consider that the results are proof that a

specific cure for dracontiasis has been discovered by JEANSELME who had previously reported a case. A single injection of 0·15 gm. of "914" in one case led to complete cicatrisation within six days. In other cases a second injection of 0·15 gm. or 0·3 gm. was used.

ii. The references to the above paper by MONTPELLIER and ARDOIN and to one by JEANSELME are given by Balfour in a letter suggesting the trial of this method.

R. T. L.

GREY (Charles Geo.). **Novarsenobillon in the Treatment of Guinea-Worm.** [Correspondence.]—*Lancet.* 1920. July 10. p. 100.

In a short letter the writer states that he has had good results by treating cases of guinea-worm with 0·15 gm. novarsenobillon with 20 cc. cold, sterilised, distilled water [presumably by intravenous injection].

R. T. L.

KOFOID (Charles A.) & WHITE (A. W.). **A New Nematode Infection of Man.**—*Jl. Amer. Med. Assoc.* 1919. Feb. 22. Vol. 72. No. 8. pp. 567–569.

A nematode ovum, apparently undescribed, was found in 429 cases out of approximately 140,000 soldiers examined by the laboratory car "Metchnikoff" in the course of a hookworm survey of increments of troops arriving at Camp Travis, Texas and various military units of the Southern Department (Texas, Oklahoma, New Mexico, and Arizona). The ovum averages 95 by 40·2 microns with a ratio of length to breadth of 2·4 : 1. It is extraordinarily variable in size and proportions but is characterised by two marked diagnostic features that clearly distinguish it from other nematode ova of man :—(a) there is a broad concavity on one face, the egg being a broadly rounded asymmetrical ellipsoid with a clearly defined double contour ; (b) there are two highly refractive, hyaline, bluish green globules flattened asymmetrically at the two poles of the embryo contained within the shell. They are sometimes combined in one large lateral or polar globule or are broken up into smaller moieties. The egg is tentatively assigned to a new species of Oxyuris, viz., *Oxyuris incognita.* The infected soldiers were examined within 2 or 3 weeks after admission from civil life, hence the infection may be attributed to the previous region of residence. There is a detailed list of the various States from which individual cases came.

R. T. L.

RILEY (William A.). **A Mouse Oxyurid, *Syphacia obvelata*, as a Parasite of Man.**—*Jl. Parasit.* 1919. Dec. Vol. 6. No. 2. pp. 89–93. With 1 plate.

In a specimen of faeces received from Zamboanga, Philippine Islands, the eggs and two specimens of an Oxyuris, hitherto unreported for man, were found. These proved on careful comparison with the description given by SEURAT (1916) to belong to the species *Syphacia obvelata*, a parasite of the mouse. Both worms were mature females 3·7 mm. in length and 0·3 mm. in greatest thickness. The cuticle was

finely striated transversely and there were two small cervical alae. The club shaped oesophagus measured 300μ in length, the bulb 100μ. The prominent vulva was situated 500μ from the anterior end and 100μ behind the oesophageal bulb. The excretory pore opened behind the oesophageal bulb. The eggs were of the typical oxyurid type, asymmetrical, flattened on one side, 125μ by 40μ. The embryo was evident in some cases. The contrasts between this species and *O. vermicularis* are striking. The eggs are notably larger and more fusiform. The author discusses whether this Oxyuris is the same as the *Oxyuris incognita* recently recorded from man in the U.S.A. by Kofoid and White. The measurements of the egg do not coincide and the conclusion reached is that *O. incognita* is a distinct species and probably one not yet known in adult form.

R. T. L.

Wislocki (George B.). **Observations on *Dioctophyme renale* in Dogs.** —*Jl. Parasit.* 1919. Dec. Vol. 6. No. 2. pp. 94–97.

Out of 3,200 dogs, upon which autopsies were performed in the city of Washington during 6 months of 1918, twelve harboured the "kidney-worm" [which for almost a hundred years has been referred to in medical literature as *Eustrongylus gigas*]. The dogs came from the Districts of Columbia, Virginia, Maryland and Pennsylvania. Five of the hosts were male and seven were females. Two animals harboured more than one worm and the majority of the worms were females. The worms occurred in every instance free in the peritoneal cavity and only twice was there an abnormal kidney. The peritoneal cavity showed constant signs of trauma associated with escape and absorption of blood. The irritating effect of the excreta and ova of the parasite induced a chronic peritonitis. A dirty brown or greenish odourless exudate of fibrinous nature clung to the roughened peritoneum. The omentum was matted with exudate and often adherent to liver, spleen, pancreas and intestines. The recorded cases of infection of man have all been reported from Europe, none from U.S.A. Blanchard reviewing the literature in 1886 found only nine human cases which he regarded as authentic.

R. T. L.

Sandersville (L. Hannah). **Trichocephaliasis and Appendicitis: Report of Case.**—*Georgia Med. Assoc. Jl.* Atlanta. 1920. Mar. Vol. 9. No. 11. p. 69. [Summarized in *Jl. Amer. Med. Assoc.* 1920. May 15. p. 1422.]

In this case the symptoms of post-operative abdominal adhesion were simulated by a *Trichocephalus trichiuris* infestation. As no gastro-intestinal symptoms were evident helminthiasis had not previously been suspected. The patient had been operated on for appendicitis; hence it was at first believed that the symptoms were caused by post-operative lesions.

R. T. L.

Ransom (B. H.), Schwartz (B.) & Raffensberger (H. B.). **Effects of Pork-Curing Processes on Trichinae.**—*U.S. Dept. of Agric. Bull.* 1920. Sept. 10. Bull. 880. pp. 1–37.

A series of experiments is related which show that the factors exerting injurious influences on trichinae in the course of curing are salt and temperature. The salt gradually undermines the vitality of the parasites, probably by withdrawing water from their tissues and also perhaps by exerting upon them a direct toxic action. It also lowers the resistance of the larvae to heat and thus renders them susceptible to temperatures which would not normally be fatal. The temperature employed during smoking or pale-drying were by themselves too low to injure the parasites seriously, but the combined action of salt and temperature was efficacious in destroying their vitality. By increasing the concentration of salt, in addition possibly to its other injurious effects, drying is also a decided factor in bringing about the destruction of trichinae.

R. T. L.

BOOK REVIEWS.

BUSHNELL (George E.). [Ph.D., M.D., Colonel, U.S. Army (Medical Corps) retired.] **A Study in the Epidemiology of Tuberculosis, with Especial Reference to Tuberculosis of the Tropics and of the Negro Race.**—v+221 pp. Illustrated by charts and tables. 1920. New York. William Wood and Company. [Price $2·75 net.]

Much of the confusion of thought on the subject of tuberculosis, as it exists in civilized communities, results from the fact that the problem is seen from too close at hand and is examined too much in detail to be properly envisaged. Too often the investigator is like one who, about to examine a section under the microscope, starts work with a high power lens instead of first getting a general idea of the condition under low magnification. It is a pleasure to take up Colonel Bushnell's volume and find that he, like William BUDD in the old days and like METCHNIKOFF in more recent times, brings to the investigation of the details of the disease a wide knowledge of its geographical distribution, its manifestations in different age groups and, above all, its behaviour when it attacks adults from communities where the tubercle bacillus is rare or unknown. As he says early in his book, "We can not comprehend how a general tuberculization influences the dissemination and progress of tuberculous disease until we know how communities and individuals fare who have not had previous acquaintance with the tubercle bacillus." He illustrates this for the reader by many striking and tragic examples. With the knowledge and sympathy of one who has dealt with the American Indian at first hand, he describes the terrible fate of those wild and free peoples when brought into close contact with civilization. Tuberculosis was for them not a malady of slow and gradual development, leading to fibrosis and chronic cavitation, but a swift and relentless destruction, a generalized disease that never paused in its progress, never hesitated in its course, never spared its victim. What a contrast to the disease that BROWNLEE has recently shown, in our cities to have its maximum mortality at forty five or fifty years of age. And yet the source of the infection that decimated these Indians was the healthy carrier, the chronic case, the civilized, tuberculized active American who, in the capacity of sentry, attendant, store keeper or instructor, brought to the captive warrior and hunter the culture of Europe and the bacillus of KOCH.

How can it be that the same etiological agent produces such completely different pictures? To all appearance, the soil is much the same. But for Colonel Bushnell and those who think with him, the difference of soil, though not apparent without the clue that is given by a familiarity with the phenomena of immunity, is vast and fundamental. The civilized, tuberculized man is a man with an acquired resistance to the disease. The savage warrior is virgin soil. These two represent the extremes of a long scale of varying combinations of infection and resistance and it is this infinite variation of soil that lends so much complexity to the responses of the human body to the tubercle bacillus. Bushnell divides the tuberculosis of the Tropics into two types. "In the first, tuberculosis is a prevalent disease as it is with us, the morbidity is high, the mortality from tuberculosis is, as a rule, higher than the average for more civilized countries as would be expected in populations for the most part poor and ignorant. The death rate from tuberculosis bears a certain relation with the general death rate, both diminishing when sanitation is improved. Chronic pulmonary tuberculosis is the common form of the disease." With this picture is contrasted another with marked differences, both clinical and epidemiological. "In the second class tuberculosis is a comparatively rare disease, the morbidity rates are low, the mortality of those that fall sick is frightfully high. Pulmonary tuberculosis in its chronic types is rare or unknown. Tuberculosis prevails as an acute and rapidly fatal general infectious disease. It may spread like an epidemic. The population diminishes and depopulation may be feared."

"The difference between the two classes that at once attracts attention is that the countries of the first class have long been more or less civilized or have been long in contact with civilized or semi-civilized races and have therefore been exposed to infection with tuberculosis, while those of the second class contain peoples who, by reason of their inaccessibility in the interior of vast continents or remote islands of the Pacific have had little or no contact with civilization until very recent times."

Of very great interest is Chapter X on "Tuberculosis of the American Negro and of the American Indian." A study of the facts here set forth should serve to convince the most obdurate that extreme susceptibility to tuberculosis is not a racial character but merely the absence of an acquired resistance. Seven or eight generations of residence on American soil in contact with Europeans has sufficed to tuberculize the African Negro and to put him in a position to survive and multiply under conditions that were fatal to the Indians brought from the prairies to "Reservations," encampments, schools and prison instead of to agricultural work on plantations and estates. The chapter on Pathology and Pathological Anatomy is full of suggestive facts and should be carefully studied by all who are interested in the disease. The views expressed correspond well with those of BORREL as recently set forth with reference to the French Colonial Troops in France during the late War. Post mortem records such as these throw a most valuable light on the clinical manifestations of tuberculosis in different age-groups and in individuals from different environmental conditions. On page 181, a curious statement is made. "In general, bovine tuberculosis is a disease of childhood and the fact that it is relatively rare in a nation of milk-drinkers is one of the best proofs that an immunity against the bovine type is regularly obtained through early infection with the human bacillus." This seems an inversion of the view generally held that the bovine bacillus, a relatively mild organism for humans, tends to give rise to some degree of immunity against subsequent infection with the human tubercle bacillus. Some of the conclusions too, in the last Chapter seem to us too sweeping though we are in cordial agreement with the general trend of the argument. But the book, taken as a whole, presents the problems of the epidemiology of tuberculosis more clearly and more instructively than any work of the kind that we have hitherto met with. We give the volume a cordial welcome as an important contribution to an aspect of tuberculosis that is not sufficiently taken into account at the present time.

S. Lyle Cummins.

COPE (Zachary). [B.A., M.D., M.S. Lond., F.R.C.S. Eng.]. **Surgical Aspects of Dysentery including Liver-Abscess.**—pp. x+157. With 2 coloured plates & 19 black & white illustrations. 1920. London: Henry Frowde & Hodder & Stoughton (Oxford Medical Publications). [Price 12*s.* 6*d.* net.]

This is a useful little monograph which makes an opportune appearance at a time when, as the result of recent military campaigns, dysentery invalids and dysentery carriers are to be found in considerable numbers in this and other countries with temperate climates, where dysentery had for some time previously existed only as an institutional disease. The work is based upon the author's Hunterian Lecture upon the surgical aspect of Dysentery delivered before the College of Surgeons early in the year and published in the *Lancet* of March 13th, but has been considerably amplified, more epecially in the sections dealing with abscess of the Liver and its treatment.

In his preface the author refers to the fact that the scanty and scattered literature of the subject has hitherto not been readily available. As a praiseworthy and successful attempt to remedy this state of affairs the book serves a valuable purpose.

In chapter I the local pathological lesions consequent upon amoebic and bacillary infections are first of all briefly dealt with, and the important fact is noted that in the subjects of antecedent dysentery symptoms may

be re-awakened by the disturbance incidental to any surgical procedure, routine preliminary purgation being possibly the main exciting factor. The surgical conditions simulating dysentery and simulated by dysentery are enumerated, appendicitis and carcinoma being the most common of the latter; and the surgeon practising in the tropics is advised not to be too ready to operate upon painful swellings in the right iliac fossa, but in some cases to await the result of stool examinations and emetine treatment. The author will probably concur with the reviewer in thinking that at the present day this warning might well be extended to surgeons practising elsewhere.

The author divides the surgical complications of dysentery into (*a*) local, (*b*) remote and (*c*) associated. Chapter II, III, and IV deal with those due to local processes in the intestines. In the consideration of perforation, a complication more common in the amoebic than the bacillary infection but rare in either, the indications for and against operation are carefully weighed. All surgeons with tropical experience will agree that immediate abdominal section is necessary in those cases in which the general condition is good and the symptoms of perforation acute, and that on the other hand, when the general condition is bad or indifferent, non-intervention is frequently justified by recognition of the facts that perforations are sometimes cured naturally, that escape of the contents of the gut is often greatly limited by adhesions, and that the bowel wall is frequently friable and unsuitable for suture. In dysenteric appendicitis symptoms suggestive of perforation are held to justify operation, whilst in their absence the effects of specific treatment on the conditions affecting the appendix in common with the caecum or other portions of the gut should be trusted to.

In chronic cases of dysentery when as the result of ulceration and sloughing the colon has become little more or less than a large septic cavity, operation may be called for with a view to providing an opening for irrigation from above, or for the purpose of entirely diverting the intestinal contents. The advantages consequent upon appendicostomy, valvular caecostomy, and open caecostomy are set forth and illustrative cases quoted. An interesting instance is given of a case in which the caecum was so seriously diseased that caecostomy was followed by a complete enterostomy, which resulted in immediate improvement, lateral implantation being performed three months later.

Chapters V to VIII are devoted to the remote lesions caused by the *Entamoeba histolytica*, the commonest and most important of which are amoebic hepatitis and liver-abscess. The pathology, signs, symptoms, and course of these affections are discussed. Due credit is given to Leonard Rogers who, by his researches, and by the introduction and advocacy of the emetine treatment, has rendered the prevention of amoebic abscess feasible, and has enormously reduced the mortality in cases proceeding to abscess formation. Stress is laid upon the point that in abscess of the liver as indeed in other conditions of Amoebiasis, whatever line of surgical treatment be adopted "it is most essential to treat the patient by emetine simultaneously." The different methods of abscess evacuation are enumerated and their technique described. The author's grounds for preferring, under civilised conditions, the open method by free incision, do not appear to the reviewer to be very convincing, but it is evident that an open mind is maintained and the advocates of aspiration may not unreasonably hope for his conversion.

Chapters IX and X deal with the remote complications of surgical interest due to bacillary dysentery, such as septicaemia, pylephlebitis, and arthritis; and with associated diseases such as parotitis, boils, and thrombosis. The greater part of the space is devoted to dysenteric arthritis, a condition in which aspiration of a joint may be found necessary, or in which measures for joint immobilisation on the one hand or restoration of joint function on the other, may call for surgical co-operation.

The illustrations are good and include two excellent colour plates. Typographical errors are absent. Paper and print leave nothing to be desired.

J. J. Pratt.

RIVAS (Damaso). [B.S. Biol., M.S., M.D., Ph.D., Assistant Professor of Parasitology and Assistant Director of the Course in Tropical Medicine, University of Pennsylvania.] **Human Parasitology, with Notes on Bacteriology, Mycology, Laboratory Diagnosis, Hematology and Serology.** 715 pp. 8vo. With 18 coloured plates & 422 illustrations in the text. 1920. Philadelphia and London : W. B. Saunders Company, Ltd. [Price, cloth, 35*s*. net.]

The contents of this well got up volume include, besides a survey of the parasites of man, an *Introduction* dealing with some biological aspects of parasitism and some landmarks in the history of parasitology, and an *Appendix* on some matters of technique.

Of the 574 pages devoted to systematic and descriptive parasitology the Protozoa and their kind occupy 178, the Worms 237, the Arthropoda 115, and the Fungi 45.

In the descriptive portions of the book the author appears most at home with the better known species of parasitic worms. Here he expounds at considerable length an ingenious mechanical interpretation—founded on observations made by Dr. A. J. SMITH and himself—of the periodic phenomena of *Filaria bancrofti* and *loa*, an interpretation based ultimately on the assumption that the embryos of these worms though actively motile inside their sheath are but passengers in the bloodstream. In the case of *Filaria bancrofti*, during the day, when the circulation is most active the microfilariae constantly contributed to the blood from the internal (pelvic) lymphatics are so evenly distributed in the bloodstream that they escape detection at the periphery, unless in specimens of blood that have been haemolysed and centrifugated. During the night, however, when the circulation is abated and all the wheels of life are slow, the microfilariae tend to be retained in the capillaries and can be detected at the periphery by ordinary clinical methods. On the other hand in the case of *Filaria loa*, which wanders superficially, far from the centres of circulation, the microfilariae tend to linger in the lymphatics at night when the lymph-streams are sluggish and to enter the bloodstream freely only in the daytime when the vital rhythms of the host are in full swing : furthermore, those that have thus entered the bloodstream during the day will tend to be retained in the capillaries of the internal organs at night (this last assumption being based on MANSON'S observation that the microfilariae of *F. bancrofti* accumulate in the capillaries of the lungs during the day).

The treatment of recent work on the Flat-worms is not entirely satisfactory. The recognition of the important discovery by MIYAIRI and SUZUKI of the intermediate host of *Schistosoma japonicum* and of the process of infection of the final host by penetration of the cercaria is meagre and perfunctory ; nor is the account of the later work of LEIPER and his colleagues in Egypt on the life-history of *Schistosoma haematobium* sufficiently accurate or appreciative. " Infection may take place by drinking water containing cercariae, or by bathing in it, since the cercariae according to Leiper are capable of penetrating through the mucous membrane or skin " is hardly an adequate statement of the conclusions of a successful investigation of first-class practical importance. Again, no reference is made to the discovery of JANICKI and ROSEN of the necessary intervention of the freshwater Copepods, *Cyclops strenuus* and *Diaptomus gracilis*, in the post-embryonic development of *Dibothriocephalus latus*. Again in the elaborate bibliographical catalogue MANSON'S epochal paper " On the development of Filaria sanguinis hominis and on the Mosquito considered as a Nurse " (*Journal of the Linnean Society*, Zoology, Vol. 14, 1879) is not to be found, and the reference to FEDSHENKOS' original paper on the guinea-worm is not correctly stated.

Of the sections on Protozoa and Arthropoda it must be said that in their statements of particular facts they do not reach the uniform completeness and the meticulous accuracy which is expected in a book of reference, and that in their generalised statements they fall short of the rigorous precision and critical perspicuity which is essential in a text book.

A. Alcock

The Director will be glad to hear from any reader who is prepared to undertake the summary or review of papers or monographs in European languages other than English and French.

Reprints and Pamphlets received :—

BERGSTRAND (Hilding). Om Influensan.—Reprinted from *Hygiea*. 1920. pp. 584–604.

FERMI (Claudio). Si puô col metodo Grassi (bonifica umana e protezione meccanica) smalarizzare l'Italia in pochi anni ? Prima replica alle critiche mosse dal Grassi.—32 pp. 1920. Rome : Tipografia L. Adriani. Via Bonella, 4.

——. Sugli anofeli e sulla malaria in relazione ai risanamenti Antianofelo-Malarici.—*Annali d'Igiene*, 1920. Vol. 30. (Supplement) 156 pp.

FINOCHIETTO (Enrique) & VACCAREZZA (Raul F.). Tumor inflamatorio del intestino grueso de origen amibiano.—Reprinted from *La Prensa Medica Argentina*.—1920. Oct. 20. 23 pp. With 6 text-figs.

GOODMAN (Herman). Frambesia Tropica (Yaws). A Study of the Literature with Personal Observations, a Critique of its Supposed Identity with Syphilis, and a Bibliography.—Reprinted from *Arch. Dermat. & Syph.*, 1920. July. Vol. 2. pp. 7–26.

——. Notes on Venereal Disease Control.—Reprinted from *Med. Record.*, 1920. Oct. 2. 10 pp.

KOLMER (John A.). A Method of Transmitting Known Numbers of Trypanosomes with a Note on the Numeric Relation of Trypanosomes to Infection.—Reprinted from *Jl. Infect. Dis.*, 1915. July. Vol. 17. No. 1. pp. 79–94.

——, SCHAMBERG (Jay F.) & RAIZISS (George D.). The Numeric Relationship of Infection to the Chemotherapy of Experimental Trypanosomiasis.—Reprinted from *Jl. Infect. Dis.*, 1917. Jan. Vol. 20. No. 1. 10 pp.

——, —— & ——. Various Methods for Determining the Trypanocidal Activity of Substances in Vitro and their Relation to the Chemotherapy of Experimental Trypanosomiasis.—Reprinted from *Jl. Infect. Dis.*, 1917. Jan. Vol. 20. No. 1. 18 pp.

KOP (Willem Alexander). De normale verhoudingen der bloedcellen in de tropen. [Thesis.]—37 pp. 1920. Leiden.

LIE (H. P.). Hvorfor er spedal skheten endnu ikke utdod i Norge ?—Reprinted from *Tidsskrift for den Norske Laegeforening*. 1920. No. 20. 9 pp.

STEKHOVEN (J. H. Schuurmans). Die Sexualität der Myxosporidia.—Reprinted from *Arch. f. Protistenk.*, 1919. Vol. 40. No. 1. pp. 28–75. With 2 plates.

——. Die Teilung der *Trypanosoma brucei* Plimmer u. Bradford.—Reprinted from *Arch. f. Protistenk.*, 1919. Vol. 40. No. 2. pp. 158–180. With 2 plates.

——. Myxosporidienstudien. ii. Die multiplikative und propagative Entwicklung der Myxosporidien.—Reprinted from *Arch. f. Protistenk.*, 1920. Vol. 41. No. 3. pp. 250–307. With 5 plates.

——. Ueber einige Myxosporidien des Stichlings.—Reprinted from *Arch. f. Protistenk.*, 1920. Vol. 41. No. 3. pp. 322–329. With 1 plate.

——. Die Gattung *Myxobolus*.—Reprinted from *Arch. f. Protistenk.*, 1920. Vol. 41. No. 3. pp. 330–340.

SWELLENGREBEL (N. H.) & SWELLENGREBEL DE GRAAF (J. M. H.). A Malaria Survey in the Malay Archipelago.—Reprinted from *Parasitology*. 1920. Sept. 28. Vol. 12. No. 3. pp. 180–198.

Note.—On direct application (not through agents or booksellers) any of the foregoing reprints or pamphlets will be sent on loan to any part of the world, the Bureau paying outward postage.

BOOKS RECEIVED.

COPE (Zachary). [B.A., M.D., M.S. Lond., F.R.C.S. Eng.] Surgical Aspects of Dysentery including Liver Abscess.—pp. x×157. With 2 coloured plates & 19 black & white illustrations. 1920. London: Henry Frowde & Messrs. Hodder & Stoughton. Oxford University Press. Warwick Square, E.C. [Price 12*s.* 6*d.* net.]

MODI (Jaising P.). Rai Bahadur [L.R.C.P. & S.(Edin.), L.F.P.S. (Glasgow), Fellow of the Royal Institute of Public Health; Lecturer on Medical Jurisprudence, King George's Medical College, Lucknow, etc.]. Elements of Hygiene and Public Health for the Use of Medical Students and Practitioners. With an Introduction by Lieut.-Col. E. J. O'MEARA, F.R.C.S. (Eng.), D.P.H. (Camb.), I.M.S., Principal, Agra Medical School.—504 pp. With 67 text-figs. Second Edition Revised & Enlarged. 1920. Calcutta & London: Butterworth & Co. Bell Yard, Temple Bar.

REPORTS RECEIVED.

GAMBIA. Annual Medical and Sanitary Report for the Year 1919.—14 pp. With 3 maps. 1920. London: Printed by Waterlow & Sons Limited.

PANAMA: Report of the Health Department of the Panama Canal for the Calendar Year 1919. By H. C. FISHER, Colonel, Medical Corps, United States Army, Chief Health Officer.—134 pp. With 1 map & 20 plates. 1920. Mount Hope: Panama Canal Press.

ROCKEFELLER FOUNDATION. Annual Report 1919. pp. xi×449. New York: 61 Broadway.

——. International Health Board. Sixth Annual Report January 1, 1919.–December 31, 1919.—210 pp. January 1920. New York: 61, Broadway.

——. Report of Work for the Relief and Control of Hookworm Disease in Nicaragua, from September 22, 1915, to December 31, 1919.—No. 7516. By D. M. MOLLOY, M.D., Director.—22 pp. With 7 text-figs. 1920. Oct. 23. New York City: International Health Board, 61, Broadway. [Lithographed Report for Limited Distribution.]

——. Report on Work for the Relief and Control of Hookworm Disease in Panama, from July 15, 1914, to December 31, 1919. No. 7514. by Frederick A. MILLER, Director.—28 pp. With 9 text-figs. 1920. Oct. 16. New York City: International Health Board. 61, Broadway.

——. Hookworm and Malaria Research in Malaya, Java, and the Fiji Islands, Report of Uncinariasis Commission to the Orient 1915–1917. (S. T. Darling, M.D., M.A. Barber, Ph.D., H. P. Hacker, M.D.) 191 pp. 1920. New York City.

UGANDA PROTECTORATE. Annual Medical and Sanitary Report for the Year ended 31st December, 1919. [Wiggins (C. A.), P.M.O.] 66 pp. 1920. Entebbe: Printed by the Government Printer, Uganda, [Price not stated.]

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